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The Relationship Between Time Teachers Spend with Students and Student Learning

A resource for Boards of Education

by
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This resource was commissioned by the Saskatchewan School Boards Association to inform boards of education of the effect on learning of consistent teacher-student contact. Read this report to learn more about:

- What the research says about the relationship between time spent by teachers with students and student learning.

- Strategies to increase student learning time and ensure effective use of time in school.

- Key questions and considerations.

Research Report #07-02

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Acknowledgements

Introduction

This report is intended to serve as a resource for boards of education regarding the relationship between time spent by teachers with students and student learning. The report is based on extensive research and related literature from a variety of sources all of which address, in various ways, the effect of instructional time on student learning. Because the time-learning relationship is complex, the report is organized around the related, but quite different definitions, of time in school – that is allocated time, engaged time, and academic (actual) time. The report provides both a description of what is meant by these three types of instructional time and explanations of how each contributes to student learning in a contemporary education system. The report attempts to show how these concepts, though related, serve different purposes from the perspectives of policy-makers and practitioners. Thus the report has two fundamental purposes i) to inform board members of the effect of consistent teacher-student contact on learning and ii) to describe various strategies that could increase student learning time and ensure effective use of time in schools by teachers and others.

The time-learning relationship is complex.

One of the important elements of this report is the realization that the relationship between instructional time and student learning has been well-studied for many years. The topic has been studied through complex statistical analyses, policy papers, and reports on school and classroom practices. Over fifty articles were collected and reviewed for the report; attempts were made to synthesize the main ideas and principles discussed in this large number of resources. This large body of evidence was used to establish common themes, descriptions, and explanations for the effects that instructional time has on learning. It was these concepts and principles that were used to best present ideas on how to address the complex issue of the relationship between time and learning.

The report is presented in four sections. First, there is an overview of the background on research and literature of how instructional time has been defined and operationalized and how it is related to student learning. This is followed by three sections, each addressing one of the three types of instructional time. Although in each case the relationship between teacher-student contact time and student learning is quite complex, the report attempts to clarify and, where possible, simplify the nature and effect of teacher contact time and student learning. It is hoped this report can provide information to members of boards of education and educational practitioners (principals and teachers) that can be useful in understanding the

time-learning relationship and in guiding policy decisions in the best interests of school staffs and students. Following the four sections is a list of references used in the report. As well, a set of guidelines for boards of education is attached as an appendix for those who may wish to more thoroughly examine the relationship between time and learning in schools today. Finally it should be noted that this report incorporates some of the ideas and information presented in *Time and Learning* (O'Brodovich, 2004) prepared for the Saskatchewan School Boards Association. This report attempts to extend and expand some of the concepts and implications of instructional time outlined in *Time and Learning*. In that sense it is a sequel to Ms. O'Brodovich's work.

Section 1

Instructional Time and Learning

Instructional time, an important aspect of student learning in Canada, is linked to all aspects of classroom learning opportunities. For example, educational progress is expressed in time increments of grade years and credit hours and student engagement can be measured by attendance rates, attentive time, time-on-task, homework hours, and school-related activities. Community-school involvement can be gauged by the time that families, organizations, and volunteers contribute towards supporting schools. Aronson, Zimmerman, and Carlos (1998) noted that research on time and learning is complicated by the way researchers address instructional time and that some research makes a generic reference to learning time as "the school day". Other studies make distinctions according to how time is used by schools, teachers, and students. Aronson et al. emphasized that when comparisons are made among research studies, it is important that these definitional distinctions are clear. Following is an overview of i) definitions of types of instructional time used in schools, ii) factors that affect the use of instructional time, and iii) models that may help explain the relationship between instructional time and student learning.

Allocated time

|

Engaged time

|

Academic learning time

Types of Instructional Time

Over the past two decades or more researchers have defined three different types of instructional (school) time: i) *overall allocated school time*, ii) *engaged* or *on-task time,* and, iii) *academic* or *actual learning time*. Aronson et. al. and others use an inverted pyramid (Figure 1) to illustrate types of instructional time. Allocated time refers to the number of hours in a school day and number of days in a school year, while engaged time and academic learning time take different proportions of the overall instructional time allocated to schooling. Figure 1 also presents four factors, in addition to time, that affect student learning. Although there are many definitions of instructional time, the generally accepted definition of each of the three types is as follows:

Allocated time. This is the total number of days or hours students are required to attend school. Allocated time can be understood as instructional time (time spent in class) and non-instructional time (lunch and recess breaks, class change and transition, school assemblies and non-classroom activities). The amount of allocated time varies among school jurisdictions; in Canada the respective

provincial or territorial education authority determines allocated time. In Saskatchewan this is typically 197 days, with approximately 940 hours of allocated time due to approved days off for professional development or similar related activities for teachers.

Engaged time. This is a type of instructional time (usually classroom time) when students are participating in learning activities. Engaged time is also referred to in the literature as "time-on-task" or as Berliner (1991) explained as ". . . the time students appear to be paying attention to materials or presentations that have instructional goals" (p. 2).

Academic (or actual) learning time. This is the instructional time when classroom learning actually occurs in a subject area, typically guided by the teacher. This is a rather complex concept that relates to other concepts of instructional time such as allocated time, engaged time, contact with curriculum and assessment instruments, and success rate. As Berliner (1991) pointed out, "[a]cademic learning time is often and inappropriately used as a synonym for engagement, time on task, or some other time-based concept. It's meaning, however, is considerably more complex . . ." (p. 3). Aronson et al., (1998) suggested that academic (or actual) learning time is *". . . that precise period when an instructional activity is perfectly aligned with a student's readiness and learning occurs"* (italics in original, p. 3). In general, academic (or actual) learning time is the teacher-directed instructional time when learning actually occurs.

It should be noted that the number of hours with teacher-student contact varies considerably among schools and school jurisdictions. For example, it has been suggested that engaged time is perhaps 75% of allocated time and that actual learning time can be less than half of allocated time. Due to variations between and among school jurisdictions it is very difficult to assign a meaningful number of hours to represent each of engaged and actual learning time.

The number of hours with teacher-student contact varies considerably among schools.

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                    ALLOCATED TIME

                    ENGAGED TIME

                     ACADEMIC
                     LEARNING
                      TIME
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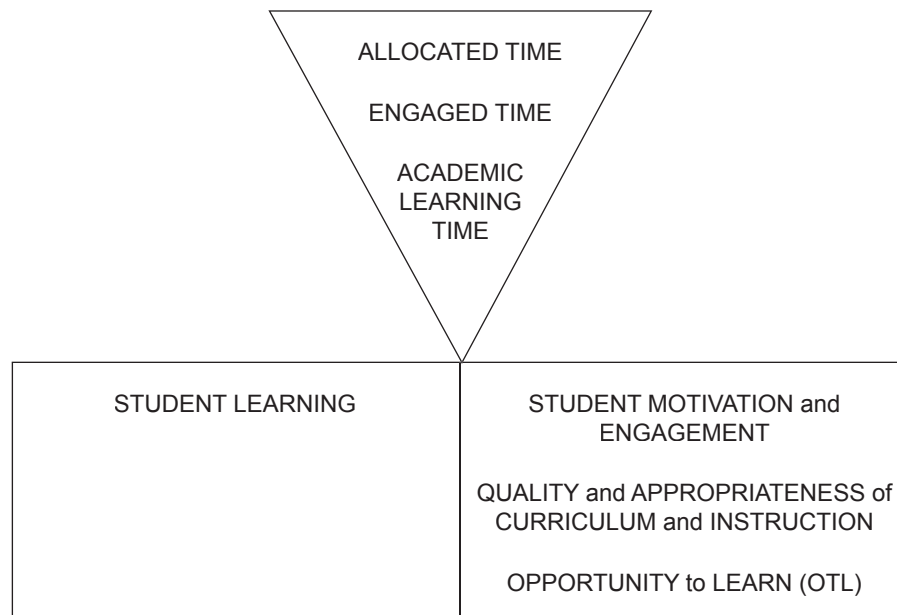| STUDENT LEARNING	STUDENT MOTIVATION and ENGAGEMENT
	QUALITY and APPROPRIATENESS of CURRICULUM and INSTRUCTION
	OPPORTUNITY to LEARN (OTL)

Figure 1. Dimensions of 'learning time'.

Adapted from: *Improving student achievement by extending school time: Is it just a matter of time?* Aronson, J., Zimmerman, J., and Carlos L. (1998), p. 2.

Although some researchers, educators, or policy-makers may have different conceptions of these three types of instructional time, for the purpose of this paper the three concepts described above will be used. It should be noted the concept of instructional time has changed over the years and probably will continue to change. Following is a brief overview of some of the factors that influence the changing conception of 'school' time.

Factors Influencing Change in School Time

Instructional time in schools is a consequence of numerous social, economic, and cultural factors in society. O'Brodovich (2004) has described this relationship from four perspectives: i) social change, ii) expanding curriculum, iii) workplace dynamics, and iv) research on time and learning. Following is a brief summary of the effects of those factors on school days and years.

Social Change

Changes in Canadian society, and in education, have meant that schools must respond to changing realities in their communities. Historically, the school year and hours reflected a primarily agrarian society and fit well with the typical workday to allow family time in the evenings and on weekends (Schell & Penner, 1993). In recent

times, work hours and family patterns have become increasingly diverse with more dual-earning couples, single parent families, shift workers, working students, and part-time or home-based employment. While any change in school schedules must be carefully considered with respect to the community needs, maintaining the status quo should be subject to the same critical evaluation. When school schedules no longer fit well with the community, change becomes a necessity.

Expanding Curriculum

An ever-expanding and changing curriculum makes school time a shrinking resource in education. New subjects and disciplines such as information processing, driver education, cross-cultural education, work education, and life skills have been squeezed into the existing allocated instructional time. Because school hours have not expanded along with the expanding curriculum, learning time must be increasingly compressed, prioritized, and juggled to meet these demands. School based administrators have attempted to maximize the amount of allocated time devoted to instruction and to minimize activities that reduce disruption and distraction of academic (or actual) learning time in any class (Aronson, et al., 1998). Even though school based administrators and professional staff work hard at effective and efficient use of allocated time, the demands of curriculum can result in having too much to learn in too little time.

Workforce Dynamics

Schools have always played a critical role in society by preparing the future workforce. As a result of accelerating technology, there are fewer jobs requiring little or no formal education and schools are expected to produce graduates who are achieving at a level necessary to fulfill the requirements of the 'new economy'. Entry level employability skills in Canada now include high-level literacy, numeracy, information management, and problem solving skills along with the capacity to continue learning. Unemployable citizens place considerable demands on social welfare, health, and justice systems; moreover to remain competitive in a global economy, societies must find ways to retain students in school and to ensure that graduates are employable. This realization has fostered a school reform and accountability movement in education in many parts of the world. One of the results of this focus on student performance and the accountability of educational leaders has been a research focus on addressing how schools can effectively use time in school to enhance student learning

Research on Time and Learning

In her review of time and learning O'Brodovich (2004) has provided a succinct review of the relationship between teacher-student contact time and student learning (achievement). She notes that research and opinion focuses on allocated learning though, at the same time, other research suggests that there does not seem to be clear evidence its relationship to student learning. On the other hand other research indicates that there is a stronger relationship between engaged, or time-on-task learning, and an even stronger positive relationship between academic learning time and student learning. This report attempts to clarify as much as possible the evidence that supports or does not support these assumptions about the three types of learning. Even when research offers consistent results to recommend particular theories, concepts or innovations on time and learning, it is unlikely these will be useful in all circumstances. What works in Calgary or Toronto may be entirely inappropriate for northern, mixed urban/rural, or urban school divisions in Saskatchewan. Thus although research may suggest promising solutions, any potential solution to an education issue will need thoughtful adaptation to fit local circumstances. The next section presents an overview of two models (Carroll and Huitt) of instructional time; these models can be useful to help describe and explain instructional time as an important resource for student learning.

Models of Instructional Time and Learning

There is considerable research literature about time and learning, with evidence that time plays an important role in student learning outcomes. However, as the research also makes clear, the quality of instructional time is also very important. Instructional time variables help to support the different but interdependent goals of understanding, prediction, and control (Aronson, et al., 1998; Berliner, 1991; Huitt, 2005). In order to help describe and explain these three goals, researchers and theorists have developed models that can help explain the factors that affect student learning. Although there is a large body of literature and research on the topic of time, learning, and schools, two general models provide a framework for decision-making related to time and student learning. The first model was developed by Carroll (as reported by Berliner 1991) who is credited as being one of the first to make a theoretical connection between time and learning. The second model was developed by Huitt (2005) and focuses on how time is spent in schools and classrooms and the relationship of learning time to student achievement.

Time plays an important role in student learning outcomes.

Carroll's Model

In 1963 J. B. Carroll defined *degree of learning* as the time actually spent learning divided by the time needed for learning; thus if time spent equals time needed, the ratio is 1.0; if the time spent is less than time needed, the ratio is less than 1.0. (O'Brodovich , 2004). Carroll believed the connection between time and learning was an obvious relationship. He also maintained that individuals learn at different rates and that individual learning rates may vary with different tasks and he depicted these basic assumptions in his time and learning model (see Figure 2).
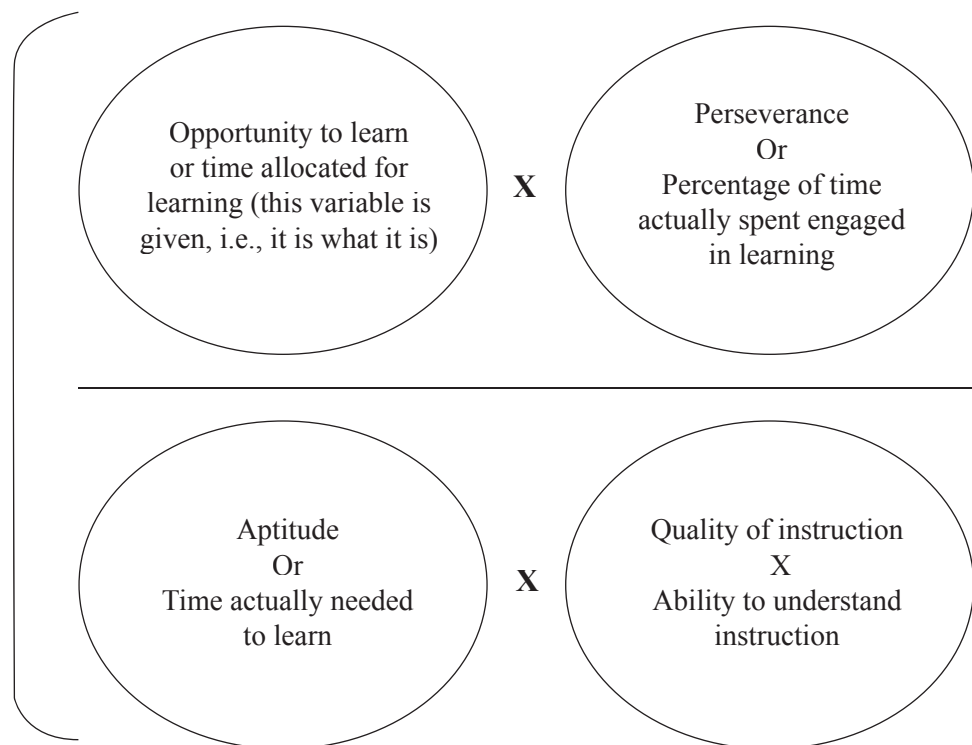

Figure 2. The Carroll (1963) Model of Instructional Time.

Adapted from: Berliner, D. (1990). *What's all the fuss about instructional time?* Teachers College Press. Columbia University.

Carroll proposed that the time needed for learning depends on five factors:

1. **Aptitude**, or the individual time needed to learn a given task under optimal instructional conditions;

2. **Perseverance** or the time the individual is willing to engage actively in learning (research literature may refer to this learning behavior as motivation);

3. **Opportunity** to learn, or the time and resources allowed for learning;

4. **Quality** of instruction, or the degree to which instruction matches individual aptitude, perseverance, and opportunity to learn; and

5 **Ability**, or the capacity to understand instruction, which is an increasing determinant of learning with decreasing quality of instruction. (Berliner, 1990, p.11).

Although, the Carroll model of learning has been generally accepted by researchers and practitioners for many years, others have attempted to describe and explain classroom learning from various points-of-view. Following is an example of a model for learning, proposed recently by Huitt that is helpful in explaining the somewhat complex relationship between instructional time and student learning.

The Huitt Model

Huitt (2005) stated that academic (or actual) learning time is the amount of time that students are successfully covering content that will be tested, so academic (or actual) learning time is a revision of the engaged time as first proposed by Carroll in 1963. According to Huitt's model (see Figure 3), academic learning time is really a combination of three separate variables:

1. **Content overlap**, or the percentage of curriculum on the test that is actually covered by students in the classroom;
2. **Involvement**, or the actual amount of time students are actively involved in learning processes. This has often been referred to as 'time-on-task'; and
3. **Success**, or the level to which students accurately complete outcome based learning activities.
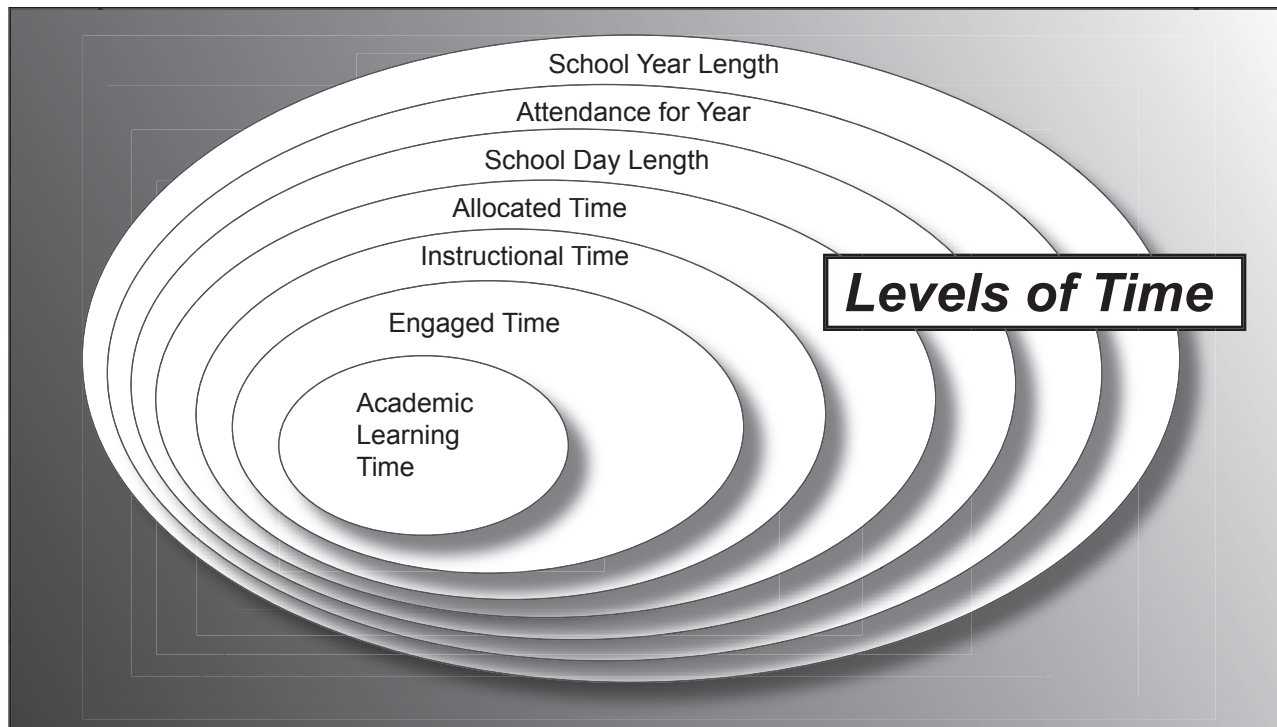
Figure 3. Huitt's Levels of Time Model.

According to Huitt (2005), a high level of academic (or actual) learning time is observable when i) students are covering the curriculum, ii) students are engaged for the majority of the class time, and iii) students are experiencing success with the majority of learning activities completed. Figure 3 shows that given that academic (or actual) learning time is the end product of how time is spent in schools and classrooms, the overarching theme is that ". . . small increases in a number of these factors can lead to large increases in ALT. " (Huitt, 2005, p. 1).

Identifying different types and levels of instructional time provides a framework that can help practitioners better understand the complexity of the concept. The model proposed by Huitt (Figure 3) is one that systematically identifies the types of instructional time that practitioners must address, beginning with the school year (allocated time) and ending with academic learning time. This report uses Huitt's model to help explain the elements of instructional time and to describe the nature of the relationship among three recognized types of instructional time

Time and Learning: A Summary

Adding hours to the school day or days to the school year as a way to increase achievement is not strongly supported by research findings. It is clear that increasing the number of minutes in the instructional day without a parallel increase in the quality of instruction will not have any substantial effect on student success. Over time researchers and theorists have emphasized that only when effective use of time is maximized will adding more time enhance learning outcomes for all students. Implementation of the concept of instructional time (and its related components such as allocated time, engaged time, academic or actual learning time) should be approached carefully. Policy makers and educational stakeholders should also acknowledge that student success is affected by a complex, interdependent web of social, emotional, intellectual, spiritual, and economic factors. To say that time alone is the variable that most affects student learning would be too simplistic and would ignore the complexity of the relationship between instructional time and learning.

Only when effective use of time is maximized will adding more time enhance learning outcomes.

The next three sections of this report provide an overview of the types of instructional time that policy makers, administrators, and teachers should consider when examining the relationship between time and student learning. In Section 2 a review of the concept of allocated time and its relationship to student achievement is provided. Next, Section 3 outlines the characteristics of opportunity to learn and engaged learning time and how they influence student motivation and achievement. Section 4 provides an overview of academic (or actual) learning time strategies for managing time (at the school and classroom levels) that can enhance and improve student learning outcomes.

Section 2

Allocated Time:
National and International Comparisons

> • Allocated time is the total number of hours and days
>   students are required to attend school.

As described in Section 1, there are several definitions and concepts
of instructional time as applied to school policies and practice.
Following are examples of how one form of instructional time,
allocated time, can be used to provide information for educational
policy-makers and practitioners. Allocated time, as interpreted here,
refers to the number of days and/or hours that education authorities
decide are appropriate for classroom, school or school jurisdictions.
The purpose of this section is to examine how allocated time relates
to student achievement at the national and international levels from
two perspectives. First, to provide an overview of some of the
results of student achievement as it relates to allocated learning time.
The second is to suggest a way to better understand the concept
of allocated time and its relationship to student achievement at the
national and international levels.

Allocated Time and Student Achievement –
A Canadian Perspective

Because parents and other members of the public are usually quite
aware of allocated learning time, the following question is quite
common. To what extent is there a relationship between allocated
time and student achievement? Comparing academic achievement
among school jurisdictions, provinces, and/or countries can be
achieved by using allocated time as an interpretation of instructional
time. One way to examine this relationship is to compare students'
results on large-scale assessments and allocated time.

In Canada allocated time is determined by the provincial or territorial
governments through the education authorities. Table 1 shows the
annual hours of instruction for each Canadian jurisdiction for both
grades 1 to 9 and 10 to 12, as reported by O'Brodovich (2004).
As shown, the hours of instruction vary somewhat by province or
territory with the range for grades 1 to 9 of 787 (grade 1-2, New
Brunswick) to 1064 hours (grade 6, New Brunswick) and the range
for grades 10 to 12 of 900 (Quebec) to 1064 hours (New Brunswick).

Table 1

*Hours of Instruction (Allocated Time) by Grade Level Across Canadian Jurisdictions**

Province or Territory	Annual Hours of Instruction per Year by Grade Level	Weighted Hours
Nunavet	997 for grades 1-6 1045 for grades 7-12	1013
Northwest Territories	997 for grades 1-6 1045 for grades 7-12	1013
Manitoba	950 for grades 1-4 1045 for grades 5-12	1003
Alberta	950 for grades 1-9 1000 for grades 10-12	950
Ontario	950 for grades 1-12	950
New Brunswick	740-833 for grades 1-2 (787 median hours) 925-1018 for grades 3-8 (972 median hours) 1018-1110 for grade 9-12 (1064 median hours)	941
Saskatchewan	940 for grades 1-12	940
Yukon	935 for grades 1-12	935
British Columbia	888 for grades 1-7 963 for grades 8-12	905
Prince Edward Island	879 for grades 1-6 925 for grades 7-12	894
Newfoundland & Labrador	760 for grades 1-3 950 for grades 4-12	887
Quebec	846 for grades 1-6 900 for grades 7-12	864
Nova Scotia	744-930 for grades 1-9 (837 median hours) 930 for grades 10-12	837
Estimated National Means – Grades 1-9 – Grades 10-12	933 Instructional Hours per Year 976 Instructional Hours per Year	

* From K. O'Brodovich (2004). *Time and learning.* An unpublished manuscript.

The hours of instruction (allocated time) should be interpreted with some caution because in some jurisdictions school time such as recess or other breaks may or may not be included. How the allocated time is used is an important concern and may vary somewhat across provinces as demonstrated in Table 1. Based on an estimated provincial average of about 976 hours of allocated time New Brunswick, for example, would appear to have approximately 90 hours more per year than the average. This is approximately one half hour per day per year. Quebec on the other hand has approximately one hour less of allocated time. In short there is variability across Canadian jurisdictions with respect to mandated allocated time.

New Brunswick, would appear to have approximately 90 hours more per year.

One of the on-going considerations among policy makers and researchers is the exploration of the relationship between allocated time and student achievement. There has been much discussion about the relationship; however, until fairly recently there was little research and/or analysis of the relationship between allocated time and achievement. Because student assessment is a provincial responsibility it is difficult to make generalizatons about the relationship between the true allocated time and student achievement. However, the Programme for International Student Assessment (PISA), (Human Resources and Skills Development Canada, 2004), an international student assessment program developed by the Organization for Economic and Cultural Development (OECD) includes Canadian students in their mathematics, reading, and science tests administered on a three-year rotation. Although questions may be raised about the validity and reliability of tests such as PISA, they do provide an opportunity to examine a relationship between allocated time and student achievement. The central question is – is there an association/relationship between allocated time and achievement? Table 2 compares allocated time for each province and recent scores for each province on the 2003 PISA tests in mathematics. The test score is transformed to a standard score where 500 is the average (mean) score.

Table 2

A Comparison of Allocated Time and Student Achievement for 15 Year-Olds

Province	Instructional Hours (yearly)[1]	PISA 2003 Math Scores[2]
Alberta	1000	549
British Columbia	963	538
Manitoba	1045	528
New Brunswick	1064	512
Nova Scotia	930	515
Newfoundland	950	517
Prince Edward Island	925	500
Ontario	950	530
Quebec	900	537
Saskatchewan	940	516
Est Mean	967	
Correlation		0.088

[1] As reported in *Time and Learning* (K. O'Brodovich, 2004).

[2] From: *Measuring up: Canadian results of the OECD PISA study* (2004). Resources and Skills Development Canada. p.70

As shown in Table 2 both the provincial allocated time and the PISA scores show considerable variability. Although there are only ten provinces involved it is possible to estimate the correlation between the allocated time and scores for each province; the correlation is an indicator of that relationship. A high correlation indicates a strong relationship, that is, high scores would be most likely to occur in provinces with more allocated learning time. In this case the correlation between time and achievement is quite low, suggesting that achievement (student scores) does not necessarily have a strong relationship to allocated time. More research and further data analysis is needed to better establish the nature of the time and student learning relationship. In the next section similar comparisons are made for mathematics achievement among countries.

International Achievement and Allocated Instructional Time

Allocated time varies somewhat among provinces (as shown in the previous section) and among nations. In the past, lack of recognized tests and other assessment instruments made it difficult for valid and reliable comparisons (within and between countries) of test results. The introduction of national and international large-scale testing programs (e.g. the PISA) has made it easier to make such comparisons. Although the general purpose of these and other tests has been for within country analysis, some researchers have looked to make across-nation comparisons. They have attempted to determine the association between two variables (i.e. time and achievement) at the international level. There have been various types of studies of that relationship where allocated time is treated as a resource, the manipulation of which could clarify and/or explain any time-achievement relationship. A study by Baker, Fabrega, Galindo, & Mishook (2004) provides an analysis of cross-national (international) and within-nations perspective on the time-achievement using the results of large-scale achievement tests and allocated time as reported by various countries.

The study first provided an analysis of allocated time in selected countries using results for PISA (2000) for mathematics, science, and reading, the Third International Math and Science Study (TIMSS, 1999), and the International Study of Civics Education (CIVICS, 1999). PISA collected data for 15 year-old students in 32 countries who, depending on the country, were in one of Grades 8, 9, 10, or 11. TIMSS (38 countries) and CIVICS (28 countries) students were in Grade 8. The analysis documented i) the reported number of hours of instruction per year in each country and ii) the number of hours of instruction in each of the subjects being tested. For example, the number of yearly hours of instruction for those taking the PISA test ranged from 1372 hours in Indonesia to 788 hours in Greece with an average across of countries of 948 hours. (Canada was reported as having 977 hours of annual instructional time for the students being tested). There were some differences in hours of instruction for the different tests used. For example, TIMSS test results reported an average of 1028 hours per year and CIVICS tests 818 hours per year.

The number of yearly hours of instruction for those taking the PISA test ranged from 1372 hours in Indonesia to 788 hours in Greece.

The correlation between these hours of instruction (allocated time) and the scores on the PISA test were described as weak (less than 0.09). The analysis also reported that the average number of hours of mathematics instruction per week ranged from 2.27 to 5.36 hours with Canada reporting 4.92 hours per week for grade 10 mathematics. Consequently, the researchers concluded "there is no significant relationship at the cross national level, between achievement test

Will allocating more time to the school day and year increase student learning?

scores and the amount of instructional time" (p. 322). As a follow-up the researchers also used the test results to examine the association of achievement and instructional time within nations. They analyzed the relationship between hours of instructional time, mathematics hours per week, and mathematics achievement. The results of the analysis were similar to those among Canadian provinces as described earlier. For Grade 8 TIMSS mathematics tests there was a negative correlation between time and achievement. The relatively large numbers of low or negative correlations led to the observation that "for most nations there is not discernible relationship, or only a very small association" (p. 323). The researchers point out that time is a school resource linked to curriculum and instruction that does not warrant much policy attention or resource allocation.

Research on the relationship between allocated time and student achievement (national and international) suggests that it is unclear if allocated time is an important factor in student academic achievement. This raises the question if allocating more time to the school day and year will increase student learning. However, more advanced forms of data analysis and data collection in the future may be used for examining the relationship between allocated time and student achievement. Until future studies provide new information, spending resources on extending allocated time for the school day or for the school year seems to be of doubtful value. In summary, because it is still unclear if allocated time is a major factor in student learning (as measured by academic achievement), more focus is necessary on the two other elements of instructional time, that is, engaged time, and academic (or actual) learning time. Section 3 and Section 4 examine these two dimensions of the time-learning relationship.

Section 3

Engaged Learning Time: Teacher-Student Contact

> • Engaged time is the instructional time students when are participating in learning activities or are spending time-on-task.

Section 1 outlined the conceptual framework and basic assumptions that underlie where and how time is a factor in teachers' instructional responsibilities and consequently, how time is a factor in student learning. Section 2 provided a brief overview of the relationship between allocated learning time and student achievement. This section will present a framework to help explain how schools may make use of engaged learning time to improve student success in school.

As described earlier, the research related to time and learning includes a large number of factors and therefore is difficult to determine if one dominant factor can be said to influence academic achievement. The topic of the relationship between instructional time and student learning has been investigated for some time with much of the focus on measuring that relationship. Indeed as described in Section 2 there is research evidence to suggest allocated learning time and achievement may not be associated to any significant degree. Nonetheless, researchers have persisted and in doing so have synthesized some of the prevailing research to identify more clearly what explains the relationship between time and learning (academic achievement). Two important factors have emerged as central to understanding and explaining student learning; i) opportunity- to-learn (OTL) and ii) student engagement. These factors are considered essential components of engaged learning time, sometimes referred to as time on-task.

opportunity- to-learn (OTL)

Student engagement

Opportunity to Learn : Some Principles

One of the important concepts that help to explain time as a factor of student learning is opportunity-to-learn. As discussed in Section 2 allocated time is a factor that helps explain how student learning is related to time (school year, school day). That is, policies related to days in a school year and hours in a school year or day assume that allocated time is instructional (learning) time and that it can be seen as an opportunity-to-learn. During the past decade or so the idea of

opportunity-to-learn has been explored from a number of points-of-view. In some studies it is defined as the condition or processes of learning. In other cases it is viewed as a form of equity that provides compensatory education for poor or disadvantaged students to give them an equal 'opportunity to learn'. A third perspective is standards-based, that is, ensuring students have been provided with an adequate or sufficient opportunity to learn the required curriculum. The final interpretation relates more specifically to student learning outcomes and combines elements of the other three interpretations of opportunity-to-learn. This model was proposed by Stevens (1996) who proposed four measurable variables that would enhance and, as much as is possible, optimize student learning. These are defined as:

- Content Coverage – Ascertains whether or not students cover the core curriculum and whether or not there is a match between the content of the curriculum taught and the content of the test or assessment.
- Content Exposure – Concerns the time allotted to students to learn (time on task) and the depth of teaching the subject.
- Content Emphasis – Determines the topics within the curriculum in which students receive instruction in low or higher order thinking skills.
- Quality of Instructional Delivery – Helps to determine how teaching practices impact students' academic achievement. This means, for example, that teachers are very knowledgeable in the subject being taught and that they monitor student performance to ensure a coherent presentation of the lesson.

As noted earlier, Aronson et.al. and others have suggested that allocated time in itself probably has little or no effect on student achievement (learning). However including the curriculum content focus as proposed in the concept of opportunity-to-learn indicates that engaged learning should be more clearly defined as curriculum contact. Thus opportunity-to-learn is a form of engaged learning time whereby students are in direct contact with the curriculum and with the intended learning outcomes of a particular course of study. A second aspect of engaged learning time is student engagement; following is a brief overview of how it can be measured.

Measuring Student Engagement – Some Principles

Student engagement is a relatively new label attached to some of the important components of successful student learning; it is a way to characterize positive student-teacher relationships that result in enhanced learning. This is not a new concept in that it has been a

opportunity-to-learn is a form of engaged learning time whereby students are in direct contact with the curriculum and with the intended learning outcomes.

component of school effectiveness principles and more recently school improvement and accountability frameworks. The concept of student and school engagement has recently been the focus of researchers examining various aspects of school reform. Fredricks, Blumenfeld, and Paris (2004) undertook a comprehensive overview of the concept of school engagement and its relationship to students' academic motivation and achievement. A generally accepted definition of school/student engagement is that it refers to students' behaviours, emotions, and cognitive (thought) processes during the school day (Klem & Connell, 2004).

> *"Behavioural engagement includes time students spent on work, intensity of concentration and effort, tendency to stay on task, and propensity to initiate action when given the opportunity. Emotional components of engagement include heightened levels of positive emotion during the completion of an activity, demonstrated by enthusiasm, optimism, curiosity, and interest. Cognitive components of engagement include students' understanding of why they are doing what they are doing and its importance."* (Klem & Connell, 2004. p.2)

Recent research on student engagement has focused on older students - middle grades and high school. Student engagement is important because in principle it represents, in part, the students' decision to become actively involved in their own learning. That form of commitment identifies the needs and pressures of students in assuming responsibility for their futures and in maximizing benefit of time in school, which is more likely among older students.

Although the concept of student engagement is quite broad and encompassing some researchers have recently presented examples of how behavioural, emotional, and cognitive engagement can be operationalized and measured as defined above (Fredricks et al., 2004; Klem & Connell, 2004). For example, behavioural engagement is characterized by behaviours such as completing homework, complying with school rules, and demonstrating effort, attention, and persistence. Emotional engagement is concerned with students' affective reactions to school such as interest, boredom or anxiety. This dimension of engagement is complex and difficult to measure although it is important because student motivation is an important aspect of engagement. Cognitive engagement addresses student investment in learning – that is, mastering knowledge and skills and being self-regulating in their approach to learning. In support of

the concept of student engagement some researchers have reported a positive correlation between behavioural engagement and higher achievement related outcomes for students at all levels -elementary, middle, and high school (Fredricks et al., 2004, p. 8-9).

In addition to defining and operationalizing the conceptual basis for engagement (behavioural, emotional, and cognitive) researchers have identified factors that affect student engagement. School level factors (i.e. student participation, school size, staff-student cooperation, etc.) influence student engagement, which can then influence student success. Teacher support (both academic and interpersonal) is also a major factor in increasing student engagement, as is classroom structure, which includes teacher expectations and consistency. The extent to which classrooms fulfill students' needs for relatedness, autonomy, and competence also affects student engagement.

In summary, student engagement "is associated with positive academic outcomes; including achievement and persistence in school; and it is higher in a classroom with supportive teachers and peers, challenging and authentic tasks, opportunities for choice and sufficient structure" (Fredricks et al., 2004, p. 20). The support for the concept of engagement is based on the assumption of engaged learning time – that is, teacher-student contact for classroom-based learning. Following is an example of a project designed to measure and promote student/school engagement and to enhance students' academic achievement and motivation to learn.

> *Student engagement represents the students' decision to become actively involved in their own learning.*

Measuring Student Engagement – An Example

A large database on student engagement has been developed through the *High School Study of Student Engagement*, (2005) which focuses on teacher-student contact and student-school contact as measures of engagement. A key element of engagement is use of time to enhance engagement during classes, in preparation for classes, and in out-of-school activities that may affect student learning and school effectiveness. Engagement in this context recognizes that engaged students get more from school than their disengaged colleagues and that engagement involves students' behavioral, emotional, and cognitive dimensions of their school life. Results from the 2005 *High School Study of Student Engagement* survey provide an insight into the type and nature of teacher-student and student-school contact that characterize student engagement and show how time is a critical component of improving student performance. Following is an example of how the survey reported student engagement, that is, how students spend their time.

How students spend their time

Teachers and school officials should be aware of how students spend their time on selected activities and how much time is necessary to optimize learning. Teachers should be aware of how much time their students spend on activities such as:

  – preparing for class, homework, studying,
  – working for pay,
  – watching television, socializing with friends, surfing the internet,
  – doing volunteer work, and
  – exercising.

Having information on how much time their students spend on such activities would be a step to help teachers determine whether time spent on those activities is appropriate or ought to be changed. For example, about half of the students devoted four hours or less to homework, reading, doing assignments, and related tasks. This information and knowledge of their students' achievement would help teachers decide whether preparation time for school was adequate or should be investigated for improvement. The same type of decision on instructional time could be made by teachers given information about time student's work for pay. It should be noted that research shows that working for pay may reduce students' grades and participation in school.

How do students spend their time?

The relationship with teachers was another aspect related to instructional time that characterized student engagement. For example, the results of the survey indicated fewer than 50% of students discussed ideas or grades with their teachers although 70% felt they had many opportunities to do so. On the other hand fewer than half of the students reported getting feedback from teachers on assignments. This dimension of engagement can be important because it demonstrates that using available time in (and out) of class could help improve learning and, presumably, increase achievement. Using current instructional time to engage more students in-class and out-of-class through assignments would serve to enhance teacher-student contact without necessarily increasing the allocated learning time for students. Rather it can be a way to make engaged and academic learning time more productive for students and teachers.

Summary

Engaged learning time as form of time-on-task is an important component of the time/learning relationship. It has more effect on learning than does allocated time because it addresses the importance of student-teacher and student-curriculum interaction both of which are important factors in improving learning. The concept of engaged learning time is important because it helps to describe and to explain how the teacher-student or student-curriculum interaction can enhance student learning. Making use of opportunity-to-learn as a form of curriculum engagement and encouraging student engagement as defined here helps provide a framework for improving student learning. Once these principles of time and learning have been well understood by policy-makers and practitioners, the concept of academic (actual) learning time should guide best practices for school and classroom-based learning. Section 4 addresses this very practical dimension of the time/learning model for improving student learning.

Section 4

Strategies to Increase Academic Learning Time

> • academic learning time is *"that precise period when an instructional activity is perfectly aligned with a student's readiness and learning occurs"* (Aronson et al, p. 4). In general academic (or actual) learning time is teacher-directed instructional time.

This report has attempted to clarify the somewhat confusing relationship between instructional time and student learning. Instructional time is defined as including allocated time, engaged time, and academic (actual) learning time that is, a framework that enables a systematic investigation of the time/learning relationship. At the same time it is recognized that research and educational practice have produced mixed results as to the influence of instructional time on student learning. However, Aronson et al. (1998) indicate that there is a relationship among the three types of instructional time with respect to student achievement. Their observation, based on an extensive review of the research, is that:

> • *"there is **little or no** relationship between allocated time and student achievement,*
> • *there is **some** relationship between engaged time and achievement,*
> • *there is a **larger** relationship between academic learning time and achievement"* (p.7).

This conclusion suggests that policy-makers and practitioners ought to focus their attention on academic learning time; this section presents an overview of strategies that can be used to increase academic learning time.

As described earlier academic (actual) learning time is the aspect of instructional time during which students' learning actually occurs. Interestingly, some research and related literature suggests that only up to 50% of allocated time is actual learning time. If that is true then clearly the focus on improving student learning must begin with increasing actual learning time. Academic (actual) learning time is different than allocated time, which is policy-based, and engaged learning time in which though students may be on task, learning may

It is important that policy-makers and school officials maximize the current allocated time available to teachers and students.

not be occurring. It is through academic (actual) learning time that students' learning is increased and motivation and achievement can be improved. As Carroll's model showed, academic (actual) learning time assumes that opportunity- to-learn (engaged learning) has been provided to students and that they are engaged in their classroom learning. Research on time and learning has shown that it is academic (actual) learning time that has the greatest relationship to student achievement; thus education policy-makers and practitioners ought to embrace strategies to enhance student learning such as: i) maximizing existing learning time and ii) overcoming obstacles to student learning.

As has been pointed out in this review of the research on instructional time, increasing allocated time (i.e. length of the school day/year) does not appear to affect student achievement. Given that assumption, it is important that policy-makers and school officials attempt to *maximize* the current allocated time available to teachers and students. As researchers have reported, the quality of instruction and classroom management largely determines the actual amount of academic learning time occurring during allocated instructional time. Following is a description of typical teacher and classroom strategies that can help make better use of time in schools including, but not limited to i) classroom management, ii) homework, iii) use of technology, iv) effective teaching strategies, v) student motivation, vi) school based leadership, vii) support for student engagement, and viii) effective parent involvement.

1. Classroom management

Well-organized, effective instruction designed for successful learning is at the center of effective teaching and is essential to positive student engagement and active learning which is a concept both practitioners and researchers acknowledge. As suggested by the research, time-on-task and academic learning time are affected by teachers' classroom management practices. There are a variety of points of view on classroom management, Huitt (1999) for example identified five guidelines for establishing appropriate student behaviors and classroom procedures. Examples of strategies for teachers and schools that enhance academic learning time include the following:

- Establish and teach classroom rules, guidelines, procedures, and routines for appropriate student behavior and the accomplishment of daily activities.

- Work with the whole class during the first two weeks to establish group cohesiveness and solidarity; if groups are used every student ought to be engaged in the same activity.
- Provide numerous opportunities for students to respond appropriately, provide the opportunity to practice and give corrective feedback to support students' accomplishing tasks successfully.
- Use a variety of enjoyable, engaging activities in the first week or two to capture students' attention, such as reviewing previously learned material and concepts.
- Monitor students' progress, ensure they are engaged and successful in learning activities, and offer support and corrective feedback as quickly as possible. (p.1)

One factor that has been discussed in relation to time and learning is class size. Results of studies of the relationship among *class size, time,* and *student learning* are mixed and more research needs to be conducted to clarify this somewhat complex relationship. Whether class size affects student engagement is an important question for administrators and policy makers and more evidence is needed to determine the nature and scope of that relationship.

2. Effects of homework

Homework is typically defined as activities assigned to students by teachers, which are meant to be attended to outside of the regular school day (Cooper &Valentine, 2001; Brewster & Fagen, 2000). This definition of homework excludes tutoring, non-academic extra-curricular activities, and correspondence types of courses and is limited to homework assigned within the K-12 school system. The results of research on the effects of homework are mixed. For example, one study (Cooper & Valentine, 2001) suggests that there is no clear relationship between homework and achievement. Others might claim that homework extends learning time for students above the primary grades. Thus, doing homework has been found to have a positive effect on student achievement under certain conditions. Guidelines for homework as a strategy to increase learning time include, but are not limited to:

Homework extends learning time for students.

- homework is most effective for upper middle years and high school students,
- high school students should do at least two hours per night, and
- a 'best practice' routine with students (i.e. clear purpose, consistency, variety, etc.) helps to ensure useful homework.

3. Use of technology

Although there is not much research examining the effect of technology on academic (actual) learning time, it is reasonable to suggest that school officials should investigate the relationship between distance education and other forms of computer-assisted learning with student achievement. Much of such learning can take place outside allocated learning time and, consequently, would need to be studied carefully.

Studies in the area of technology and learning, for example, found that while technology has potential for enhanced learning opportunities for students, computers are essentially a communication tool. It is also recognized that instructional technology has tremendous promise for enhancing academic learning time and student engagement, however, we must also remember that technology is a catalyst to learning. In this way, technology is an element of teaching and learning, not *the* element of teaching and learning. Earle (2002) noted that it is important to remember that technology is not a separate subject and that the focus is pedagogy – the effective practices of teaching and learning. Therefore, focus must be upon fitting the computer to the curriculum not the curriculum to the computer.

4. Effective teaching strategies.

Effective teaching strategies are a necessary condition for student learning.

It goes without saying that effective teaching strategies are a necessary condition for student learning and numerous studies have identified the impact that teachers and schools have on student learning. Effective teachers are products of high quality pre-service training, meaningful professional development and positive forms of classroom collaboration. It is also acknowledged that more learning time will not itself overcome poor or ineffective teaching. As pointed out earlier at least two principles – opportunity –to-learn and student engagement are viewed as fundamental to facilitating academic (actual) learning time. The combination of those principles, high quality teacher training and support for on-going teacher growth will help to ensure that students experience effective teaching strategies.

5. Student motivation.

Aronson et al. (1998) revealed that there is considerable research evidence that identifies intrinsic motivation as more powerful than extrinsic motivation when it comes to high levels of engagement and academic performance. Jensen (1998, (as cited in O'Brodovich , 2004) recommended strategies for activating students' intrinsic

motivation without resorting to threats or rewards such as, i) resolving tensions or problems, ii) setting daily learning goals with choices and clear relevance for students, iii) creating a positive classroom climate, iv) teaching students to recognize and manage their emotions, and v) implementing immediate, specific, and constructive feedback

(from: *Time and Learning*. O'Brodovich, 2004)

6. School-based leadership and time management

As the research literature reveals, allocated time is eroded by school schedules that devote too much time to non-instructional activities not directly related to student learning. School assemblies, pep rallies, announcements made over the intercom, class transitions, and class changes, fire drills, sporting events, and spirit days all contribute to the amount of time students spend outside of academic learning time. This is an issue for school administrators to resolve and may include alternatives such as block scheduling, balanced school day, and forms of the extended school day or year.

Block scheduling. Block scheduling has been linked to academic (actual) learning time to allow for more in-depth instruction, opportunities for interdisciplinary curriculum connections, and linkages to service learning. Block scheduling reduces the amount of time given to class transitions, starting and stopping time, and moving between shorter class periods. In this way, block scheduling addresses time lost to moving from one class to another, stopping and starting, to lessen transitions associated with 'traditional' six or seven period school day scheduling. It could be argued that by encouraging more student-teacher contact, block scheduling could also enhance engaged learning time.

Balanced school day. The balanced school day is another administrative procedure that may potentially maximize existing learning time. The balanced day sets the school instructional day into three, one hundred minute blocks of time separated by two forty minute nutrition/activity breaks. Students eat during the first twenty minutes of the break and engage in outdoor activity for the second half. Schools designate one of the breaks as the 'going home' break for those students able to do so. Cassidy (2005) reporting on Ontario schools that had implemented the balanced day suggested that principals should explore alternatives such as but not limited to, i) block scheduling and alternative schedules, ii) reducing interruptions during instructional time, iii) allowing time for team planning, iv) longer periods for sustained involvement in class projects, etc.

Based upon feedback from balanced day schools, it was suggested that that when students have larger blocks of instructional time supported by regular nutrition and activity breaks, their concentration and motivation to learn increases.

Extended day programs. Although the concept of the extended day seems well-studied there does not seem to be compelling evidence that it significantly affects student learning. Results of research on extended day programs (before and after school, Saturday school, summer school etc.) have shown that for some students, such as the at-risk or low-performing, can benefit from an extended school day (Dodd & Wise, 2002). This is a type of engagement that, while encouraging, depends very much on the teachers chosen to participate in such programs.

7. Support for student engagement

As discussed earlier the teacher-student relationship is a key component to enhance student motivation and achievement. Using strategies such as the High School Engagement Survey principals and teachers could document the level of student engagement in their school. Following are some examples of types of engagement that can help increase student performance:

Student centred teaching approaches. Research has identified the value of academic learning time when learning activities are designed and implemented from the student perspective. For example, cooperative strategies, project-based learning, non-linguistic choices, skill-based, relevant and connected to students' 'real world' experience and context activities have been found to exhibit higher levels of student engagement.

Small learning communities. As a structure that maximizes existing learning time, small learning communities emphasize individualized, developmentally appropriate, and student-centred practices. Teaching strategies are varied, research-based and reflective of 'best practices', and students are at the centre of instruction. If student needs warrant individual intervention plans, such plans are timely and appropriate.

Career Academies. As a subset of small learning communities Career Academies are small schools usually located within larger schools and are organized around a broad theme. In the case of high schools, the academy is organized around a broad career theme such as culinary arts, health care, business and finance, electronics, travel, computer science and technology, performing arts, and a many other career tracks. Kemple and Snipes (2000) note that career academies are small learning communities where small groups of students

(usually 150-300) share several classes every day and have some or all of the same teachers for at least two years of high school. In this structure teachers work as a team and share in decision making. Within career academies the curriculum combines and integrates academic and career-related subjects. Local employers are involved as partners and serve on advisory boards with teachers, school staff, and senior administration. However, a coordinator typically serves as liaison between the academy and various stakeholders. Employee representatives serve as speakers and mentors, provide internships, give advice on curriculum, and contribute financial or 'in-kind' support.

8. Effective parent involvement

It is well known that parental and community support is an important characteristic of effective schools. The implementation of School Community Councils in Saskatchewan offers the opportunity to involve parents in school policies that can affect academic (actual) learning time. Parent and community reaction to use of allocated time for rallies, field trips, graduation days, fund raising, etc. could help guide administrative decisions on the place of such 'lost' time in schools. Although there may be some risk in involving parents in decisions related to academic (actual) learning time, the rewards in terms of student learning can be important. For example, decisions on keeping schools open longer each day and offering before and after school programs will be more effective with parent and community support. Thus the opportunities for school and community-based practices to increase academic (actual) learning time are manifold if school leaders, professional staff, and community are willing to support the strategies (and others) suggested here. It should be noted that in addition to these policies and practices, there may be a need for policy-makers and educators to address existing obstacles to enhancing academic (actual) learning time. Following are some examples of such obstacles and suggestions as to how they might be addressed.

Parental and community support is an important characteristic of effective schools.

Overcoming Obstacles to Academic (Actual) Learning Time

The classroom strategies and various other techniques listed above provide a basis for better use of instructional time, particularly academic learning time, however there are other factors that, despite teachers best efforts, may reduce the effectiveness of academic learning time. Examples of such obstacles include, but are not limited to; i) teacher absenteeism, ii) "lost time," and iii) the "fall-off" effect.

Teacher Absenteeism. Teacher absenteeism is a matter of concern to administrators and policy makers who may feel such absence affects student learning. For example, Woods (1997) in a study of teacher absenteeism and grade three students reading achievement found there was some evidence that a relationship does in fact exist between these variables. However, there is a lack of research to support this conclusion and policy makers would need to be cautious about developing policies on teacher absence without the evidence to support the view that such absence affects student performance.

"Lost Time". It has been estimated as many as 50 hours of allocated learning time can be lost each year due to classroom interruptions and school activities. Reducing this "time lost" is the responsibility of the board of education and principals. It is suggested that school officials document the time used for assemblies, festivals, fairs, parent-teacher conferences, field trips, rallies, etc. Once this information is known, they could establish a generally accepted number of hours for these activities. It is recognized that the number of hours may vary across schools and school jurisdictions but would be the responsibility of schools to reduce such time 'lost' that could then be used as academic (actual) learning time.

> *Reducing "time lost" is the responsibility of the board of education and principals.*

"Fall-off" Effect. There is evidence that some students (particularly slower learners) are disadvantaged by long breaks from school – such as 8 – 10 weeks of summer vacation. Some suggested solutions to this effect include providing 'summer school' for those students. This could take the form for learning camps for remedial work or other forms of mentoring. In some cases this problem has been addressed through year round schooling where vacation breaks (2 – 3 weeks) appear more often over a calendar year and there is not a sustained 8 – 10 week break.

Summary

This section has attempted to address some of the practical issues in the relationship between instructional time and student learning in school. The earlier sections on allocated and engaged time revealed a modest if any effect on learning for allocated or engaged learning time. However, the research and related literature on time and learning indicates that the primary focus of policy-makers, administrators, and practitioners should be on academic or actual learning time. More research is needed on topics such as those described here one to determine the extent to which new policies need to be developed with respect to teacher absenteeism, the 'fall-off' effect, lost time or other such obstacles to effective teaching and learning.

Conclusion

The relationship between the time students spend learning in school and their achievement is one that is of interest to all partners in education – parents, school staffs, administrators, and students themselves. This report has attempted to describe and explain that relationship. It has been pointed out that there is an extensive body of research and literature examining this topic from many perspectives. The specific purpose of this paper is to focus on how teacher-student contact time has an effect on student learning. Although the results of the review of the literature may not be conclusive, they do provide evidence that effective use of teacher-student contact time can enhance student learning and improve academic achievement. Specifically it is recommended that schools and classroom teachers focus on enhancing student engagement and on strategies that make better use of allocated learning time which ultimately leads to more and better academic learning time. These two factors, taken together, can maximize student learning. The results of this study indicate that it is highly probable that sufficient time is being allocated for student learning and that more hours or days in the school year may not be the answer to improving student learning. Rather it is how the currently allocated time is used that can make the difference in student performance. By emphasizing student engagement and reducing obstacles to such teacher-student contact, opportunity-to-learn will be improved. It is the role of policy-makers to support educators' attempts to enhance engagement and the educators' responsibility to ensure teacher-student contact is focused on learning opportunities.

Effective use of teacher-student contact time can enhance student learning and improve academic achievement.

This report has attempted to synthesize and evaluate research findings and professional opinion with respect to the time-learning relationship. Clearly there is a very large body of research and other literature that have examined the effects of allocated, engaged, and academic learning time on student learning. It is also clear that the time-learning relationship is quite complex and not easily explained. As stated in the introduction to the report, it has been quite difficult to synthesize and summarize the amount of information dealing with questions about how instructional time can best be used to facilitate student learning and to enhance student achievement. Thus the purpose of the report is to provide guidelines for policy development on managing time in schools and to improve classroom instruction and student learning. It is hoped that the observations made in this report can provide a basis for further investigation by researchers and to encourage practitioners (trustees, principals, and teachers) to help

explain the nature and scope of the relationship between instructional time and student learning. The focus over the past decade or more on school reform and educational accountability suggests that policy-makers and practitioners are expected to have the knowledge and ability to ensure that students' time in school has the best possible effect on their achievement in a full scope of intended learning outcomes.

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Research

R E P O R T

The Relationship Between Time Teachers Spend with Students and Student Learning

Research Report #07-02 Workbook

by
Brian Noonan, PhD

This workbook presents a summary and key discussion questions from Research Report #07-02 **The Relationship Between Time Teachers Spend with Students and Student Learning** by Brian Noonan, PhD. University of Saskatchewan.

Introduction

The Saskatchewan School Boards Association commissioned a study to provide information for school boards on the relationship between time spent by teachers with students and student learning. Research Report #07-02 reviews a number of research and policy studies that examine the issue of 'time' and 'learning'. Specifically the report examines the ways time can be used to enhance student learning and the effect of consistent teacher-student contact time on student achievement. The report also provides information that compares provincial and other policies on current instructional time and how student learning time might be increased or improved.

Increasing the time allocated can improve student learning if students are engaged and instruction is effective.

The purpose of this discussion paper is to summarize the research report and to present a framework to encourage discussion among stakeholders (trustees, administrators, teachers, parents, and students) on the issues of school time and student learning. It is important to note that there is a large body of related literature on the subject of 'time' and its influence on student learning and that there is some very extensive and interesting points-of-view on time and learning. However there does not seem to be any single "answer" to questions about the policies, principles, and practices that boards of education and others must address to clarify the important but sometimes unclear relationship between instructional time and student learning. There is need for policy-makers and practitioners to discuss the principle and practices that effect time spent with students on student learning. Following is a summary of the research on three types of instructional time.

Types of Instructional (Teacher-Contact) Time

Three types of instructional time have been suggested as a framework for the relationship between the time teachers spend with students and student learning. These include: i) allocated learning time, ii) engaged learning time, and iii) actual learning time.

   i) *allocated learning time*. This is the policy set out by governing bodies (provinces, territories) as to the total number of hours and/or days students are required to attend school. For example, in Saskatchewan 197 days per school year are typically required as the allocated learning time which comes to 940 hours of instruction per year. It has been shown that the allocated learning time in Canadian provinces and territories varies from 837 to 1013 hours per year.
   ii) *engaged learning time*. This is the instructional time in school during which

students have both the opportunity-to-learn and may be actually engaged in learning. Engaged learning time requires that teachers and students focus on the intended learning outcomes outlined in the curriculum and on the best classroom learning strategies.

iii) *academic learning time*. Sometimes called **actual** learning time academic learning time is the learning time that produces success (achievement) for students. Academic learning time is most likely to affect student learning.

ALLOCATED TIME

ENGAGED TIME

ACADEMIC LEARNING TIME
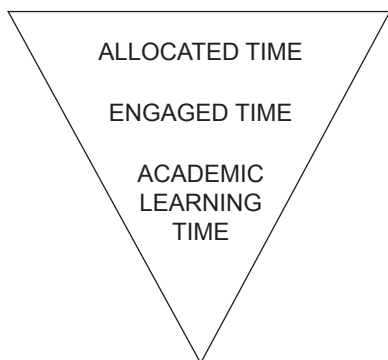
Following is a brief overview of these three types of instructional learning times. More detailed accounts of these types of learning times are found in Research Report #07-02.

A. Allocated Learning Time

Is sufficient time allocated for successful student learning? Is there a measurable relationship between the amount of time that authorities allocate for school and student achievement? Each of these questions helps focus on policy-based time for schools, students, and teachers.

Is sufficient time allocated for successful student learning? What options are there for time allocations?

Allocated time is an important component of time and teacher-student contact. It is generally recognized that allocated learning time policies differ across provinces in Canada. Although there is a substantial body of research on the question of allocated learning time, there is no clear or simple indicator to suggest that the number of days or hours allocated for student learning actually directly affects student achievement. Comparing allocated hours of instruction with student achievement does not provide, for example, a clear picture for policy-makers or administrators of the relationship between allocated time and student learning. For example, the information in Table 1 (see Appendix) provides a sense of how educational authorities set the expected student learning time in schools and is an example of how policies on instructional time might vary among school jurisdictions. Further, although conventional wisdom suggests that more time on a school subject should produce higher achievement, there does not seem be clear evidence to support that point-of-view Table 2 (see Appendix).

B. Engaged Learning Time (Time-on-Task)

Whereas allocated learning time is a **policy decision** made by education authorities to set guidelines for teacher, parents, and students, **engaged** learning time (time-on-task) is based on the principle that certain types of teacher-student contact is necessary for student success. Time-on-task assumes that two important educational principles of effective student learning are in place. First, all students must have the opportunity-to-learn that is they must have contact with the appropriate and relevant provincial curriculum and must be exposed to high quality instruction. Second, positive student-teacher relationships are fundamental to productive successful learning experiences; student must be 'engaged' in learning in their behaviour, attitude, and desire to learn. Both opportunity-to-learn and engagement are general principles of student achievement and both are necessary conditions for students to experience engaged learning. It is recognized that, for example, time-on-task requires that: i) students have the opportunity to learn through clearly stated curriculum objectives, ii) that students willingly commit their time and energy to learning and iii) that teachers support student engagement. In short, student engagement is characterized by positive learning outcomes, supportive teachers, student persistence, and positive student-teacher contact.

Are the conditions favourable to engage students in learning? If not, why not?

C. Academic (Actual) Learning Time

Allocated learning time is policy-based, engaged (time-on-task) learning time is a basic principle for school success, however it is **actual learning time** that contributes most to students' success. It is the practical use of allocated time and time-on-task that will most likely produce the most successful students. Some of the practical uses of teacher-student learning and contact time include: classroom management (the learning situation), use of technology, the best use of time (i.e. homework), effective teachers, the intrinsic motivation of students, and parent and community involvement. Actual learning time also assumes the teachers and students acknowledge the common sense practices that can influence productive actual learning time including teacher/student absenteeism, lost or wasted time in school, sustained learning opportunities, scheduling/timetabling practices and parental involvement.

How might classroom practices be improved?

Summary

The three types of instructional time have an effect on the relationship between time teachers spend with students and student learning. In summary the research on this relationship has led to the conclusion that schools work with three types of instructional time:

i)   allocated or policy based time that is important from the policy perspective but has little direct effect on student achievement.

ii)   engaged or time-on-task learning has an important effect on student learning but that effect is somewhat indirect. It assumes positive student relationships with the curriculum expectations and with classroom teachers.

iii)   actual learning time involves paying attention to the classroom practices that can improve learning and indeed has the greatest direct effect of student learning.

The teacher-contact and accompanying instructional questions are not new to educational research and development. This report has tried to provide a framework to examine ways to ensure that schools and school staffs use instructional time effectively.

The following section presents a number of topics based on the research paper that may serve as guidelines for discussion among educational policy makers and leaders to examine the questions related to the time teachers spend with students and student achievement.

Questions and Issues for Discussion

As described earlier Research Report #07-02 examined how instructional time is being used, and how it ought to be used, to increase student learning. Following are some guidelines that may help policy-makers, administrators, and practitioners develop policies, principles and practices to better and more effectively use instructional time.

1. What is achievement?

Public education today is much influenced by the emphasis on accountability and improvement in all aspects of the education enterprise. Frequently that focus is on student performance usually labelled 'achievement'. Although there is nothing inherently wrong with this focus, there is a need to more specifically define what is meant by the term achievement. Typically achievement is taken to mean **academic** achievement even though modern educational philosophy and policy advocates a "full scope of learning". In Saskatchewan that idea was captured in the Common Essential Learnings which included not only an academic emphasis (communication, numeracy) but other dimensions of learning as well – personal/social skills, independent learning, critical/creative thinking, and technological literacy. When the relationship between instructional time (allocated time, engaged time, academic/actual learning time) and achievement is questioned, policy-makers need to be sure that appropriated time is being allocated to these and other forms of "non-academic achievement". Thus when questions are raised about "non-instructional" school activities (field trips, sports events, rallies, etc.) administrators need to decide whether such activities may indeed be designed to enhance student learning in a valid but non-academic context.

> *How has your school division defined 'achievement'?*

- Policy-makers and practitioners need to have a clear understanding of the contribution of non-instructional time to student learning.

2. Is time lost?

As pointed out there is a wide range of activities conducted under the auspices of allocated time. The topic has been much researched from many perspectives as described earlier.

How effectively is time used in your school?

In order for administrators and practitioners to enhance engaged time and academic (actual) learning time, it is necessary for those individuals to be fully informed as to how much allocated time may be lost, how **all** of this allocated time is being used. The process of documenting and reporting on how allocated time is used is time consuming in itself. However it is only by knowing how time is used (allocated time, engaged time, academic/actual learning time) that changes in practice or policy will be effective.

- Administrators and teachers must know, with some precision, how allocated learning time is used in their school.

3. Is teaching effective?

Time used in a school day or year is a measure of the effectiveness of the school. How teachers use their time, how students use their time, and how administrators use their time contribute to an effective school. Effective schools are those in which the success of their programs and policies are evaluated and reported and the information used as a

How might school effectiveness be improved?

formative assessment of the school. The lost and disrupted time described can be addressed through a systematic school effectiveness program. The SELU and other organizations are well equipped and experienced to provide such information to a school staff, students, and the parent community. It is noteworthy that the newly implemented Continuous Improvement Framework (Saskatchewan Learning) encourages/demands such on-going types of assessment.

- Conduct school effectiveness reviews (formal and informal) on a regular basis.

4. Are Parents Involved?

The importance of parent and community involvement in schools is well documented and acknowledged. Because parents are one of the stakeholders in how instructional time is used in a school, they must be involved in assisting the staff with making the best use of allocated learning time. Parent involvement in engaged learning time and academic learning time are necessary for successful, high performing schools. Therefore it is wise, and probably necessary, for school officials to consult with the parent community with respect to uses of instructional and non-instructional time. For example, as described earlier homework is a form of engaged learning that has value, particularly for older students. The establishment of School Community Councils will not doubt affect the type and level of parent involvement in school policies and practices.

How might parents be engaged to support the focus on learning time?

- Enhanced student engagement means there must be enhanced parent engagement. This does not mean 'parent-run' schools but rather commitment and responsibility by parents on behalf of students to ensure students' engaged learning.

5. Is there flexibility in the schedule?

Time is a resource that can be manipulated in the best interest of students, staff, and community. As long as the school is within allocated learning time, changes can be made in school schedules to enhance students' learning opportunities. There is considerable documented research and experience related to modified school days and school years. Block scheduling, extended days, balanced days, summer school, changing summer holiday schedules, and other forms of modified allocated time have been practiced for some time. This is a case where school policy-makers, administrators, and teachers must focus on maximizing engaged time and academic (actual) learning time in the interest of student learning. Another aspect of flexibility is class size, a much studied issue. As with the time/learning relationship the results of research on the class size/learning relationship are not clear. By itself it is logical to assume that smaller classes will enhance student learning, however research suggests that other factors such as student ability, can confound the time/class size relationship.

How might allocated time be better used?

- Consider ways to use allocated time in a flexible manner that conforms to generally accepted school days and school years but is delivered in one of several available alternatives.

6. Is there evidence of school-based leadership?

Although some aspects of instructional time are policy-based (allocated time), effective use of time is, or should be, a responsibility of principals. Most of the strategies listed above (scheduling, parent-involvement, school effectiveness) are a function of school-based leadership. The current emphasis on accountability in education assumes that principals and school staffs are capable of making appropriate professional judgements in their school context. However, such devolved forms of decision-making also means that policy-makers must empower school-based personnel with responsibility and trust that decisions will be made. Accountability without empowerment can paralyze school-based leadership.

What are some examples of principal empowerment and accountability reporting in our school division?

- Accountability assumes trust and empowerment at all levels of decision-making. In what ways can school leaders take responsibility for decisions related to student learning time in school?

7. Is data used strategically?

One of the most prevalent initiatives of contemporary educational organizations is the use of data to improve services. "Data driven decision making" is the catch phrase. As this paper has pointed out there is an abundance of information on the relationship between instructional time and learning. Although the amount of information on this relationship makes it very difficult to reach a clear, unambiguous conclusion, nonetheless educators at all levels have the obligation to obtain, interpret, and utilize that information in the best interests of students. It is hoped that papers such as this provide a guide for using data strategically.

- Information (data) used in decision-making must be meaningful to all educational partners. Consideration should be given to collecting data on how time is used in a school.

Increasing academic (actual) learning time is the most effective way to increase teacher-student time as the basis for improving student learning. However, to do so requires the knowledge and commitment of all educational partners (policy-makers, parents, professional educators).

What data do we have about use of time and learning in our school division?

Table 1

Hours of Instruction (Allocated Time) by Grade Level
Across Canadian Jurisdictions*

Province or Territory	Annual Hours of Instruction per Year by Grade Level	Weighted Hours
Nunavet	997 for grades 1-6 1045 for grades 7-12	1013
Northwest Territories	997 for grades 1-6 1045 for grades 7-12	1013
Manitoba	950 for grades 1-4 1045 for grades 5-12	1003
Alberta	950 for grades 1-9 1000 for grades 10-12	950
Ontario	950 for grades 1-12	950
New Brunswick	740-833 for grades 1-2 (787 median hours) 925-1018 for grades 3-8 (972 median hours) 1018-1110 for grade 9-12 (1064 median hours)	941
Saskatchewan	940 for grades 1-12	940
Yukon	935 for grades 1-12	935
British Columbia	888 for grades 1-7 963 for grades 8-12	905
Prince Edward Island	879 for grades 1-6 925 for grades 7-12	894
Newfoundland & Labrador	760 for grades 1-3 950 for grades 4-12	887
Quebec	846 for grades 1-6 900 for grades 7-12	864
Nova Scotia	744-930 for grades 1-9 (837 median hours) 930 for grades 10-12	837
Estimated National Means – Grades 1-9 – Grades 10-12	933 Instructional Hours per Year 976 Instructional Hours per Year	

* From K. O'Brodovich (2004). *Time and learning*. An unpublished manuscript.

Table 2

A Comparison of Allocated Time and Student Achievement for 15 Year-Olds

Province	Instructional Hours (yearly)[1]	PISA 2003 Math Scores[2]
Alberta	1000	549
British Columbia	963	538
Manitoba	1045	528
New Brunswick	1064	512
Nova Scotia	930	515
Newfoundland	950	517
Prince Edward Island	925	500
Ontario	950	530
Quebec	900	537
Saskatchewan	940	516
Est Mean	967	
Correlation		0.088

[1] As reported in *Time and Learning* (K. O'Brodovich, 2004).

[2] From: *Measuring up: Canadian results of the OECD PISA study* (2004).
Resources and Skills Development Canada. p.70