

Increased Percentage of Passing Grades on the Massachusetts Comprehensive Assessment
System after Implementation of Block Scheduling

By

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Abstract

This study examined one public school system's change in its bell scheduling format from a seven period day to block scheduling. The data collected was from a three year period of the grade 10 students passing the Massachusetts Comprehensive Assessment System exam.

Students in Massachusetts must pass the mathematics and English/language arts subject tests in order to receive their diploma. There were 762 total student results that were observed that included one year prior to the change in the schedule and two years after the change in the schedule. There was an increase in the percentage of students passing the graduation required subject tests of over 15% over the first two years of the block scheduling.

Since the release of the report by the National Association of Secondary School Principals (NASSP) of *A Nation at Risk*, there have been a tremendous amount of school reform initiatives introduced to education. Based upon TIMMS data, several nations were attaining higher scores in achievement tests and surpassing the American students in developing new products and successful marketing of these products. The U.S. was falling behind in the development of new technologies in which the United States was a global leader during the space race.

“The school reform and restructuring movements of the last decade have caused school leaders to search for new ways to educate students” (Arnold, 2002, p.42). According to Cawelti (1994), the term restructuring describes a significant change with the intention of increasing productivity and effectiveness. One of the issues raised in school reform is time. It has been discussed in terms of length of the school year, length of the school day, and structure of the school day. Since the school calendar has been fixed for an extremely long time and the school hours have also been fixed, it is a difficult trend to overcome. “Decades of school improvement efforts have floundered on a fundamental design flaw, the assumption that learning can be doled out by the clock and defined by the calendar” (National Educational Commission on Time and Learning, 1994, p.13). There has been tremendous opposition from parents due to students afterschool activities, teacher unions with the need to increase pay with increased time, and athletic schedules all being affecting by large changes in the school day. Since there has been opposition to making anything but superficial changes in the calendar year and length of the school day, the area of change reform that has been attempted has been in the change of the bell schedule within the framework of the already existing school day.

Throughout the current decade, numerous high schools have been actively engaged in restructuring the school day. The need to increase student achievement, and the need to provide students with more active learning opportunities in order to meet mandated increases in graduation requirements have caused schools to examine different scheduling patterns (Calvery, Sheets, and Bell, 1999, p. 17).

According to Eineder and Bishop (1997), some effects with the implementation of a block schedule became apparent almost immediately. There was tremendous academic success for the freshman class. The students attaining honor roll status doubled from previous years. The other grades also showed achievement trends during the first year of implementation of the block schedule. As mentioned by the National Education Commission on Time and Learning, the relationship that has developed between the student and teacher in the long block setting has been a positive factor in student achievement. Students need to develop a strong relationship with adults at school since there may not be one in the home. The time spent on different in-class activities has provided a wider variety of instructional methods as tools for the teacher to teach to all of the students' varied learning styles.

In the study done by Gruber and Onwuegbuzie (2001) in the State of Georgia using the Georgia High School Graduation Tests, they determined that there was not a significant amount of improvement. In fact, they noted that there was a negative effect on academic performance.

In the Commonwealth of Massachusetts, the passing of the Education Reform Act of 1993, established many reforms designed to improve student achievement. Students in grade 10 must

pass the mathematics and English/language arts exams in order to graduate from high school, thus making this a high stakes test.

There are several different kinds of scheduling models that schools have used. There is the traditional 7 period per day schedule consisting of 45 minute class instructional periods. Students generally take 6-7 courses that run for the entire year. There is also the modified traditional schedule where one class each day would be a double period and one period would not meet that day to accommodate the double period. This schedule would incorporate a rotation of seven days to ensure each period has an extended block. This schedule would facilitate a longer science lab period. There is also a block schedule with four 90 minute periods running courses every day for a semester (rather than the entire year) as well as a block schedule with classes that meet every other day for the entire year.

Hypothesis

H₁: The changing of the school's bell schedule from a traditional 7 period per day, 45 minute periods to a 2 x 4 70 minute long block period with classes meeting every other day will increase student achievement.

Method

Participants

The data observed came from 762 students from one Massachusetts High School, North Reading High School (NRHS) grade 10 students, who took the MCAS (state mandated assessment) in mathematics and English/language arts from 1999 to 2001. The school changed its schedule from traditional to block for the 1999-2000 school year. The data observed was for

the school year 1998-1999, the year prior to the bell schedule change, and the data for school years 1999-2000 and 2000-2001, the first two years after the bell schedule change. In Massachusetts, mathematics and English/language arts assessments must be passed if students are to receive their diploma.

Independent variable:

Changing the school bell schedule. Nine years ago North Reading High School as a faculty and staff decided they needed to change their instructional practices to better the knowledge the students received. This decision was teacher based as guided by the administration of the school and supported by the district administration and school board. The NRHS faculty undertook the task of changing how they teach by doing professional development into the styles, identifying the styles, and learning how to teach to the styles.

The faculty then realized that they needed to change their bell schedule to extend the time they had with students. This was a significant change in the core of the school's academic program. They needed to spend a longer block of time working with the students. They went to a macro schedule that consists of a 2 day cycle where there are 4 periods each day that are approximately 70 minutes long. Courses meet every other day for the entire school year.

Dependent variable

Achievement on MCAS. Students take the MCAS exams (Massachusetts' state mandated assessment) in mathematics and English/language arts in the spring of their sophomore year of high school. MCAS exams are also given in various lower grades beginning in grade three, but at the high school level, the students must pass the exam in order to graduate. The scores on the test range from 200- 280 and are divided into four categories. A score of 260-280 is classified as advanced, 240-258 is classified as proficient, 220-238 is classified as needs improvement, and

200-218 is classified as failing. Students need to attain a score of at least 220 to be considered passing. They may also retake the exam during the next two school years until they pass each of the two subject area exams

Results

MCAS passing percentage hypothesis

There were 762 students who took the MCAS test in three successive years from 1999-2001. In 1999 there were 290 students who took the MCAS test where there was a mean of 73.93 % of the students who passed both the mathematics and English/language arts portions of the exam. This was the year prior to the bell schedule change to block scheduling. In the following two years, there were 472 students who took the MCAS exam and attained a mean of 89.19% passing both portions of the exam.

Table 1 shows the group statistics where we assume equal variances ($t=23.2$, $df=760$, $p<.05$) depicts a critical value of t distribution with a one-tailed test to equal 1.645. The t value of 23.2 places that point in the distribution range to reject the null hypothesis. This increase in the percentage of students who passed the MCAS exam allows us to reject the null hypothesis, thereby supporting the research hypothesis that the change in the bell schedule at North Reading High School increased the percentage of students who pass the mathematics and English/language arts portion of the exam. The effect size, Cohen's d, was 1.52, considered large by Cohen's (1988) criterion.

Table 2 depicts how the students performed on the individual subject exams of mathematics and English/language arts. There was an observed 15.25% pass rate increase for both subjects combined. By subject there was an increase of 8.7% for English/Language Arts and 21.64% for math. In English/language arts there was a ($t=52.72$, $df =378$, $p<.05$) and for mathematics

($t=26.33$, $df=380$, $p<.05$) again giving support for the hypothesis. These results show a significant increase in the passing rate on this exam after two years of after the change in the bell schedule.

Discussion

The results of this analysis of data shows that at North Reading High School (NRHS) there was a significant increase in passing the state mandated assessment for graduation. The change in the bell schedule to a block schedule is the tangible element that may be the catalyst for the increase in achievement. This was not the only element that could have brought about this change in achievement. There have been other high schools that have changed to block scheduling, but have had little positive results. Some have had even negative results. This was seen in the study done in the State of Georgia.

The positive outcomes seen at NRHS may also be attributed to the amount of professional development that was undertaken prior to the change and continued after the change in the schedule. Clinicians were brought in to train the teachers in using the longer time periods to the benefit of the students. Many of these clinicians were members of their own staff including the principal. They developed strategies to teach to the students' different learning styles. They revised the curriculum to adjust it for the amount of time they had to deliver it. Students were now able to take eight courses per year instead of just seven as in the past. Teachers were able to use several different types of assessments with longer instructional time available to them. The subsequent hiring of new teachers trained in long block format has been valuable.

This type of change is expensive. The school had to increase its course offerings, hire more faculty and staff, and increase the amount instructional materials teachers need. They made a

concerted effort to make all of these things occur and the school board also provided the funding. Even in times of budget constraints they maintained their commitment to continuing this program. The positive gains that have been made by the students have been well worth the money that has been spent to reach these high levels of achievement.

There is the need to monitor this change to see if the results attained can be maintained over a long period of time. If that is the case, more schools should be making this change in order to address increased student achievement. The governing bodies of school districts should be ready to incorporate these changes, but someone needs to pay the bill. The national commissions make recommendations; state legislatures pass mandated reforms; and local school boards are left to administer the reforms. The research shows that this can be successful, but many steps need to be taken if the change is to be successful.

Over the course of the past eight years, NRHS has seen a steady increase in the per cent of students passing the MCAS (Massachusetts' state mandated assessment) in the spring administration of the exam to students in grade 10. The results of the grade 10 students who took the exam in the spring of 2008 yielded a 100% passing rate of students attending the district high school. The only failing students were those students in outside of district placements.

Table 1 Pass rates on MCAS assessment pre and post change of bell schedule

	Type of bell schedule used	N	Mean	Std. Deviation	Std. Error Mean
Passing rate on MCAS	Block	472	89.1864	7.98294	.36744
	Traditional	290	73.9310	10.01705	.58822

Table 2 Pass rates on MCAS assessment pre and post change of bell schedule, for

Group Statistics^a

	Bellschedule	N	Mean	Std. Deviation	Std. Error Mean
Passrate	1.00	236	92.7288	1.98574	.12926
	.00	144	84.0000	.00000	.00000

a. Subject = English/LA

English/Language Arts and mathematics

English/Language Arts

	Type of bell schedule used	N	Mean	Std. Deviation	Std. Error Mean
Passing rate on MCAS	Block	236	92.7288	1.98574	.12926
	Traditional	144	84.0000	.00000	.00000

Mathematics

	Type of bell schedule used	N	Mean	Std. Deviation	Std. Error Mean
Passing rate on MCAS	Block	236	85.6441	9.92870	.64630
	Traditional	146	64.0000	.00000	.00000

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