

Minneapolis Public Schools Start Time Study

Executive Summary

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Background

Effective with the 1997-98 school year, the Minneapolis School District changed the starting time of its seven comprehensive high schools to 8:40 AM. and the dismissal time to 3:20 PM. Prior to the change, classes began at the high schools at 7:15 AM and dismissed at 1:45 PM. In the 1997-98 school year, the Center for Applied Research (CAREI) in the College of Education and Human Development at the University of Minnesota was asked by the Minneapolis School Board to examine the impact of the later start upon its students, staff, families, and community members. The information from that study can be found in "Start Time Study Report of Findings," November 1998, as a bound report provided to Minneapolis School District administrators. The report is now also available on the school district and the CAREI websites. (See - <http://education.umn.edu/carei/Reports>)

In the fall of the 2000-01 school year, CAREI was asked by the school district to examine the data about student grades and attendance and to repeat the administration of the School Sleep Habits Survey. The district was interested in knowing if the positive outcomes that had been present during the first year of the change were persisting over the long term. This report is the result of that follow-up study.

Statistical Significance

In some of the tables containing data, there are comparisons in the numbers between the number that indicates the value before the change to a later start versus the value after the later start was initiated. If the difference between the two numbers is unlikely or highly unlikely to be due merely to chance, then the difference is said to be "statistically significant." In other words, a statistically significant difference means that in less than one in a hundred times (<.01) or in less than one in a thousand times (<.001) would this finding happen purely by accident. A finding with statistical significance means that something is going on that shouldn't be attributed to chance.

Attendance

The source for the attendance data being analyzed in this study is the data repository for the State of Minnesota, MARSS. Data is entered into the MARSS data base for every school district in the state. Attendance data for the Minneapolis School District was available/retrievable for a five-year period, 1995-2000. Therefore we have data for two years when the school district high schools began classes at 7:15 AM, in 1995-96 and 1996-97, and we have data for three years when high school began at 8:40 AM, in 1997-98, 1998-99, and 1999-2000. Data for the 2000-01 school year was not yet available from the MARSS system at the time this report was being written. The total number of students in the data set used for these analyses is 50,962 students enrolled in grades 9-12 in the seven Minneapolis high schools.

There are a number of terms that need definition in order that the reporting of findings is clear.

- Enrolled in Same School are students who have stayed in the same high school, not having transferred to any other school or program in the Minneapolis District.
- Enrolled in the Same District are students who have stayed in the Minneapolis District, although they may have transferred to one or more different schools or programs within the District.
- Continuously Enrolled (CE) students are those students who have attended two years in a row, as sorted either by being in the same high school or by staying in the Minneapolis School District.
- Not-continuously Enrolled (not-CE) students are those who have not had two consecutive years' enrollment, as sorted either by not being in the same high school or by not staying in the Minneapolis School District.

Ethnic categories are established by the MARSS system. School districts report numbers of students into the following categories as labeled by MARSS:

- American Indian/Alaskan Native
- Asian/Pacific Islander
- Hispanic
- Black, not of Hispanic Origin
- White, not of Hispanic Origin

Findings For All Students

- Attendance rates for all students in grades 9, 10, and 11 in the district have shown to have improved statistically significantly in the years from 1995-2000. The greatest rate of improvement is for 9th grade students, where the daily rate of attendance went from 83%-87% after the later start was initiated. The probability that this would occur by chance is less than one in a thousand.
- Attendance rates for most students continuously enrolled in the school district or in the same school hover around 93%-94% daily attendance. The rates for students in grades 9 and 10 have remained constantly slightly better after the change to a later start was made. The effect of the change is more variable for students in grades 11 and 12.

- Attendance rates of students in grades 9, 10, and 11 who are not continuously enrolled in the same school for two-year blocks of time range from 72%-78%. Their daily attendance rates have a marked improvement after the initiation of the later start time in 1997-98. The changes are statistically significant for these students in grades 9, 10, and 11.

Findings By Ethnic Group

- Attendance rates appear to improve as the grade of the student rises (e.g., 11th graders have better attendance than 9th graders).
- For the ethnic groups of Asian, Hispanic, Black, and White in grades 9-11, there was an improvement in the attendance rates from pre- to post-change in start time. For the group of American Indian students, there was an improvement in grades 9 and 10, with a slight decrease in attendance rate in grade 11. Attendance rates in grade 12 were mixed for all students.
- Attendance rates for continuously enrolled students in the district or in the same school were similar, and ranged from 89%-96%. Continuously enrolled Asian students had the highest attendance rates for all ethnic groups.
- The numbers of students who were continuously enrolled versus the numbers of students who were not continuously enrolled varied by ethnic group. The groups of students identified as Hispanic or Black were both at a ratio of approximately 1:1, continuously enrolled versus not continuously enrolled, after 9th grade. Asian and White students had a ratio of approximately 2.5:1, continuously enrolled versus not continuously enrolled, in grades 9-11. American Indian students had ratios that varied from 1:2 to 1:1.5, depending upon the year and the grade.

Continuous Enrollment

- A key finding of this study is the fact that the percentage of high school students who are continuously enrolled in the district or in the same school has statistically significantly risen since the 1995-96 school year. For example, the percentage of 10th graders who were continuously enrolled went from 55% in 1995-96 to 67% in 1999-2000. Concurrently, the percentage of students who are not continuously enrolled has significantly decreased. This means that an increasing number of students are staying in the same school or in the same district for two or more years. And the number of students who move in and out of the district or move from school to school is in steady decline.
- As students move up in the grades, from grades 9 to 11, the amount of continuously enrolled students steadily increases at each grade level. Part of this finding may be related to the fact that students in grades 11 and 12 are not mandated by age to be in school. Therefore, the percentage of students who are continuously enrolled would be expected to be greater than it would be for students in grades 9 and 10.

Impact on Grades

An analysis of letter grades earned in classes during the three years' prior and the three years after the change to a later start time was completed. This task was more complex and difficult than anyone would ever have imagined. There were more than a million data points in

the total database. Data was anonymous, listed by student ID number. Issues of fair comparison arose for a number of reasons:

- Course names - Titles of classes differed from school to school, so that comparisons of similar classes were very difficult to make. For example, there were 642 differently named math classes over the five years among the seven high schools. This was also a problem in most other content areas (English, the sciences, social studies, etc.)
- School differences - Length of class periods (four periods of 90 minutes on the block schedule, versus a 6- or 7-period day) and number of grading periods (semesters versus trimesters) are different from school to school, making equitable comparisons extremely difficult or impossible.
- Student transience - Grades are kept by school, so if a student begins a semester in one school and then moves mid-semester to another school, the class entries in the first school may be left blank for the listed courses, with the same student showing up in a different set of classes in the second school.
- Data entry - If a student is entered by the school into the student record-keeping system with any changes in the spelling of the name or an incorrect birthdate, the student is assigned a new student ID number. Even with anonymous data, it was often apparent that the same student was put into the system multiple times.
- Missing data - Several hundred thousand data points (grades earned) were missing in the overall database. Grades earned are entered at the school level and the completeness of entries, by school, was inconsistent.

Given the numerous obstacles to obtaining "clean data," it required nearly a year of time to conduct this analysis. The ultimate findings from the analysis of the letter grades earned by students in grades 9-12 in the three years prior to the change (starting time of 7:15 AM) versus the grades earned in the three years after the change (starting time of 8:40 AM) reveal a slight improvement in grades earned overall, but the differences were not statistically significant. A finding from this time-consuming and intensive data analysis is that the difficulty of making comparisons and subsequent judgments is likely to be a problem for any district attempting to judge the efficacy of a change using the letter grades earned as the primary indicator.

Student Survey - Preliminary Results

The School Sleep Habits Survey developed by Bradley Hospital at Brown University was administered to a stratified random sample of Minneapolis Public School 9-12th graders in December, 1997 (school year 1997-98) and again in January, 2001 (school year 2000-2001). All students in both years attended schools with 8:40am start times. This data set is currently being analyzed, however several initial findings are noted:

- Students in the 1997 survey reported a mean school day bedtime of 10:48pm. This time is statistically similar to the 2001 reported a mean bedtime of 10:41pm.
- Students in 1997 reported a mean weekend bedtime of 12:40am, statistically similar to the reported weekend bedtime of 12:42am in 2001. Likewise, students in 1997 reported a mean weekend wakeup time of 9:51am, while students in 2001 reported a mean weekend wakeup time of 9:49am, not a statistically significant difference.

- The impact of circadian rhythms and similar weekend schedules (i.e. work, social, family) in both years are likely contributing to the similar wake up and bedtimes.
- Minneapolis high school students continue to get an hour's more sleep each school night or obtain five more hours' sleep per week than students whose high schools begin an hour earlier than Minneapolis schools. This finding supports the medical researchers' finding that nearly all teenagers become sleepy at about 11:00 PM. It also lays to rest the fears and expectations that a later start would mean that Minneapolis students would just end up staying up an hour later on school nights.

Additional findings from the student survey are currently being analyzed and will be shared with the Minneapolis School District as soon as that is completed (anticipated to be December 2001).