

Did the 4X4 Block Schedule Improve the Education of Students at a Small Rural High School?

by

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ABSTRACT

This project explains the introduction of 4X4 block scheduling in a rural Michigan high school. The subject school switched from a traditional schedule to the 4X4 block schedule in 1995-96. The subject school's stated goal was to prepare all students to be successful learners. The staff and administration did not believe that this goal was being met. This is why the subject school switched to the 4X4 block schedule. Many believe the traditional schedule leads to fragmented instruction and fosters low student achievement. As a result of this concern block scheduling emerged. Data analysis of the 4x4 block scheduling at the subject school was done by comparing data from 1993-94 and 1994-95 school years in which the traditional schedule was used and from 1995-2000 in which the 4x4 block was being used. The population for this case study was the entire high school student body, approximately 276 students at the start of the data analysis and approximately 230 at the end of the data analysis. A sample of 19 out of 57 students that started high school at the subject school in 1993-94 and graduated in 1996-97 was also analyzed. When analyzing the entire student population their grade point averages (G.P.A.) increased slightly after the 4x4 block schedule was in place, failure rates dropped dramatically, drop-out rates remained quite low, American College Test (ACT) composite scores increased slightly, and student discipline referrals dropped dramatically. The sample had similar results. 13 out of the 19 students improved their G.P.A. during the 4x4 block schedule and all 19 students either remained at a 0% failure rate or experienced a dramatic drop.

TABLE OF CONTENTS

I.	Introduction	1
II.	Purpose	2
III.	Literature Review	2
IV.	Research Population	9
V.	Methodology	10
VI.	Findings and Graphs	11
VII.	Conclusion	15

INTRODUCTION

One of the most popular reform initiatives for enhancing secondary school achievement has involved efforts to alter the traditional schedule with its six or seven 50 minute class periods. A good example is block scheduling. This is a schedule, according to Cawelti in which "at least part of the daily schedule is organized into larger blocks of time (more than 60 minutes) to allow flexibility for a diversity of instructional activities" (Irmsher, 1996). "Many educators are concerned that the traditional schedule of seven periods per school day leads to fragmented instruction and allows limited time for individual learning" (Canady & Rettig, 1995). Educators are seeking to discover a way to organize instruction more effectively and therefore improve the quality of learning (Kruse & Kruse, 1995). That has brought about block scheduling.

There are many varieties of block scheduling. "Although several hybrids and modifications of block scheduling exist, almost all represent some variation of two basic forms: the alternate-day schedule and the 4/4 semester schedule" (Rettig & Canady, 1999b). In the alternate-day schedule classes meet every other day for approximately double the class time in the traditional schedule. This schedule typically comes in six-, seven-, and eight-course formats (Rettig & Canady, 1999b). This study will focus on the 4X4 block. "This schedule divides the day into four 90-minute blocks instead of 6 or 7 50 minute periods" (Schoenstein, 1996). The students will finish the four block classes in 18 weeks instead of 36 weeks and will take four new classes for the last 18 weeks. Advocates suggest that reorganizing the school day, using block scheduling, will improve students' education. This study will look at the students' grade point averages (G.P.A.'s), failure rate, drop-out rate, American College Test (ACT) composite scores, and student-discipline referrals before the 4X4 block schedule was implemented in 1995 and after the implementation (over the past five years) to see if these variables have been affected.

PURPOSE

This case study will examine the impact of the introduction of 4X4 block scheduling at the subject school. The study will consider changes that have occurred since the introduction of block scheduling on student grade point averages, American College Test scores, student failure rates, and student disciplinary referrals. Based on the results of this case study, I will raise issues and questions for further research.

LITERATURE REVIEW

The research on block scheduling can be organized into two areas: effects on school climate and the effects on academics. This study's literature review will focus on the these two areas.

"In nearly all of the more than 100 case studies, dissertations and reports completed on block scheduling, the number of discipline referrals to the office is reduced, typically between 25 and 50 percent. Evidence also exists that in-school suspensions decline, that teacher and student attendance improves slightly and, for obvious reasons, the number of class tardies is reduced" (Rettig & Canady, 1999b).

Effects on academics have been investigated primarily by studying grade point average, honor roll achievement, number of failures, drop-out rates and students' performance on standardized tests. "Consistent evidence shows that students' grades improve and the number of students on the honor roll increases. Studies show declining failure rates in 4/4 schools and a greater likelihood that students labeled "at risk" will remain in school" (Rettig & Canady, 1999b).

Roy J. Wesson High School, in Colorado Springs, Colorado was having a terrible time with their students' failure rate, in 1990. "A needs-assessment survey showed the

staff was most concerned about class size, limitations in course offerings, teacher workload, and stress (for both teachers and students). A faculty steering committee noticed most problems revolved around a time crunch, and decided on a 4 X 4 "block" schedule" (Schoenstein, 1996). This is a schedule that divides the day into four 90 minute periods instead of the traditional schedule which has six or seven 50 minute periods. In the 4 X 4 "block" schedule students complete four classes each semester or eight classes a year. Schoenstein (1996) found over the past four years while operating on the 4 X 4 "block" schedule that the percent of students scoring a four or five on the Advanced Placement (AP) exams increased from 26 to 37%; the daily attendance increased from 91.7 to 93.7%; the number of students on the honor roll increased from 20.8 to 26.5%; the number of credits earned increased; and the average number of students each teacher taught was cut in half. He also found that the failure rate dropped from 31% to 25% and that the number of seniors entering college immediately after high school increased by 10%. The results of standardized tests are varied; Scholastic Aptitude Testing (SAT) scores are down, but more students are taking the ACT and those scores are up. Schoenstein (1996) believes the entire culture of their school has positively changed. He cautions schools that block scheduling will not solve all of their problems. He states that research and training for the staff must be done before a school takes the steps to change their daily schedule.

Edwards (1995) strongly believes that the 4X4 "block" schedule promotes student learning. Orange County High School's goal was to have every student accepted into a postsecondary program or employed in an entry-level position. The block schedule allows students to get more credits faster than the traditional schedule, which opens up opportunities for students to use their junior and senior year to take part in some sort of post-secondary study or school/work experience. Over the past four years starting in 1993 the number of seniors taking two or more postsecondary

classes off campus rose from 5 to 26 (Edwards, 1995). Students are completing more courses, grades are increasing, and more students are taking and passing AP exams (Edwards, 1995). Officials at Orange County believe that the 4X4 Block Schedule has promoted greater learning while students are in school and gives them a better chance to move into higher education or employment.

In 1994, a survey found that about 50% of responding high schools had adopted some form of block schedule. Many believe that block scheduling has the potential to unlock time and allow teachers to be more effective and students to learn more (Canady & Rettig, 1995). Block scheduling, according to Canady and Retting, can solve three problems: it can take care of "haphazard" pull-out programs and other interruptions in the school day, reduce school discipline problems, and help students who simply need more time to learn (Black, 1998). A number of researchers report that after the introduction of block scheduling student credit hours increased, grades and attendance improved, disciplinary problems decreased, failure rates went down, and the number of students receiving honors at graduation increased. These researchers, however, report that the ACT and SAT scores did not improve and in some cases went down (Canady & Rettig, 1995). Given the conflicting data on student achievement, critics believe schools need to think long and hard before changing their daily schedule from the traditional schedule.

Researchers conducted a study of six secondary schools that switched from traditional to block scheduling, to compare the merits of each. The study focused on the effects on student achievement, attendance, and discipline. The researchers also administered a survey to staff, students, and parents to see their attitudes toward the block schedule as compared to the traditional schedule. The findings of this study support block scheduling. The students earned higher grade point averages; they completed more classes; graduation rates increased; daily attendance increased; and

the number of violent infractions decreased. He also stated that there are concerns about block scheduling and that these issues need to be examined and addressed (Khazzaka, 1997).

Wilson and Stokes (1999) undertook a comparative study to determine the effectiveness of block scheduling. The research questions were: 1) "What do teachers perceive to be the major advantages of block scheduling? 2) What do teachers perceive to be the greatest measurable outcomes of block scheduling?" (Wilson & Stokes, 1999). The study examined four different high schools, two of which were in their first year of implementing the block schedule, and the other two of which were in their second year of block scheduling. A three-section Likert Scale was used to collect the data. "Strongly disagree" was assigned a 1 and "Strongly agree" a 5. The means were found for each of the 31 items in the Likert Scale. Conclusions were that teachers viewed the block schedule positively. Teachers perceive there are advantages of the block schedule over the traditional schedule. A decrease in discipline problems and an increase in daily attendance were perceived as the measurable outcomes significantly affected.

Philo High School in Southeastern Ohio had problems with unmotivated, poor performing students. They looked to the 4 X 4 block schedule and after a year of research they decided to implement it. Two of the questions they wanted answered were: " Would student achievement improve? How would block scheduling affect student behavior?" (Eineder & Bishop, 1997). During the first two years of the 4X4 block schedule, the average number of ninth graders making honor roll doubled for the first grading period and ninth graders achieving honor roll status increased for the year long totals by 92 percent. They state, "that these are comparisons of different students who may have different levels of ability, who may have received different instruction prior to their high school experience, or who may have encountered other factors that

could affect achievement" (Eineder & Bishop, 1997). They did look for other reasons for the vast increase in honor roll status but could not find any to account for the increase. They also analyzed the academic performance of 11th and 12th graders who attended high school under both the traditional schedule and the block. They showed remarkable gains after the introduction of block scheduling. They achieved a 24 percent increase in the number of A's and a 15 percent decrease in the number of F's. They also found statistically significant improvements in their grade point average and honor roll attainment.

They also found widespread improvement in student behavior. "The Chi-Square test identified statistically significant reductions in the frequency of :

- * Discipline referrals ($p < .05$)
- * Tardy referrals ($p < .001$)
- * In-school suspensions ($p < .001$)
- * Out-of-school suspensions ($p < .001$).

Dropouts decreased from 4.6 percent to 4 percent, average daily attendance increased from 93.7 percent to 94.7 percent, and the number of students involved in fights reduced by 40 percent" (Eineder & Bishop, 1997). This study at Philo High School supports other research that shows that: "under the block schedule students earn higher grade point averages, more students attain the honor roll, and discipline referrals are reduced" (Eineder & Bishop, 1997).

Two of the main issues related to block scheduling are: 1) How does block scheduling affect school climate, and 2) How does it affect student achievement? Shortt and Thayer (1998-1999) documented the relationship between block scheduling and positive school climate when they examined data collected from public high schools in Virginia that used block scheduling. The Virginia Department of Education conducted a survey of schools using block scheduling and 77 percent of the 168

schools that were using block scheduling at that time responded. The survey indicated that block scheduling affected several indicators of positive school climate. Principals noted the change created a more relaxed environment for teachers and students, cut down on unsupervised movement within the school, reduced fights, reduced referrals to the administrative offices, improved teacher morale, and improved teacher attendance (Shortt & Thayer, 1998-1999). Shortt and Thayer (1998-1999) also showed that only one percent of the responding teachers and five percent of the responding administrators indicated that block scheduling had a negative impact on standardized tests. "In block scheduled schools, we have evidence of a greater emphasis on staff development at the school level, increased attention to instructional programs, and more differentiated instruction based on students' needs" (Shortt & Thayer, 1998-1999).

William Reid, Thomas Hierck, and Larry Veregin (1994) conducted an analysis of the data collected at School District 7, Nelson, British Columbia after they implemented a version of block scheduling. Students took two subjects for a ten week period and then wrote their final exams. They repeated this for four quarters thereby completing eight subjects per year. Comparisons were made to the traditional approach using, "measures of student achievement(G.P.A), attendance(% present), tardiness(% on time), and retention rate(% completing school year)" (Reid, Hierck, & Veregin, 1994). Data was compiled from 650 students in grades 10 to 12. The block schedule started in September 1991. "In 10th grade, the failure rate decreased in 4 of 5 subject areas, in 11th grade the failure rate declined in 8 of 9 courses, at the 12th grade level, student performance improved in 6 of 9 subject areas" (Reid, Hierck, & Veregin, 1994). The number of students earning a 3.0 grade point average and thereby achieving honor roll status increased 50 percent. The school's graduation rate increased from 70 to 90%. The data suggests the block schedule is a highly effective structure for the senior high

school, but they also realize other factors may contribute to the improvements over a two-year period.

Dave Snyder, a Science teacher at Angola High School in Angola, Indiana, performed a data analysis of the 4X4 block schedule by comparing baseline data from the previous two years. "After two years of block scheduling, highly significant improvements...were found in school-wide grade point averages, including all departments except physical education/health and special education. There was a significant...increase in percentage of students on the honor roll. American College Testing Assessments scores improved significantly..., and the Indiana State Proficiency Exams improved to some of the highest scores in the area. Scholastic Aptitude Tests have remained about the same. Advanced Placement Scores slightly dropped. Increased usage of the media center was recorded and fewer discipline problems occurred. Attendance improved significantly..." (Snyder, 1997).

Thomas Edison High School in Fairfax County, Virginia was a highly successful school that adopted the 4X4 block schedule. They implemented the 4X4 block in 1994-95. In its 5th year of the 4X4 block the enrollment has increased from 1047 to more than 1400 students; the minority population has changed from 39.5 percent to 52 percent; and students receiving free and reduced lunches increased from 20 to 25 percent of the enrollment. At the same time, "the combined average SAT score went from 978 to 1029; students earning a 3 or higher on their Advanced Placement Exams increased from 70 percent to 81 percent; the dropout rate fell from 8.50 percent to 5.90 percent; final course grades of F dropped from 10.1 percent to 7.1 percent; the number of students on honor roll went from 196 to 420; and students earning the Advanced Studies Diploma increased from 51 percent to 60 percent" (Retting & Canady, 1999a).

There are critics of the 4X4 block schedule. They believe there is lack of hard data on student achievement. Jeff Lindsay in Appleton, Wisconsin argues that schools

should think long and hard before giving up their traditional schedule (Black, 1998). He admits there are "some interesting success stories at several schools," but maintains that schools often fail to consider three "common sense" objections to block scheduling (Black, 1998).

"First, Lindsay says, doubling the length of a class from 45 minutes to 90 minutes doesn't mean students will learn twice as much. (Instead, he says, teachers often use "fun activities" to fill up time.) Second, he says students' retention—that is, how much they remember of what they've learned—lags when there are long time gaps between classes in sequential courses such as biology and advanced biology. And third, he calculates that, in some cases, students actually spend less total time in long block courses than they would if they took the same courses in a traditional schedule" (Black, 1998).

All of the articles looked at the effects of the 4 X 4 "block" schedule versus the traditional schedule on such variables as: daily attendance, failure rates, number of classes taken, honor roll percentage, class size, number taking AP classes, discipline, grades, standardized test scores, and school climate. All, but Lindsay, believed the block schedule created a better learning environment for the students; however, they warned that it is not a cure all and that teacher training was needed for teachers to teach longer periods of time.

RESEARCH POPULATION

At the start of the 1993-94 school year the staff and administration at the subject school looked at the most recent marking period grades and felt that they were not meeting their stated goal of preparing all their students to be successful learners. 36% of the 9-12 graders earned at least one failure, with 19% earning more than one. They believed that seven classes were too much for many of the students. Their early

brainstorming of the problem led to an investigation of Joseph Carroll's book The Copernican Plan. Carroll was a presenter at a conference attended by the subject school's principal in 1989. This model still had students taking what the subject school thought was too many classes at one time for their students. Since this model did not fit all of the subject schools needs, they looked into the 4x4 block schedule and found that another rural school district in Michigan was currently using that schedule. They sent a team of teachers and the assistant principal to visit that school with a list of questions the teachers had developed and came back with very positive feedback. After that they visited and compared programs at four other schools in Michigan.

Their first presentation to the Board of Education was on December 12, 1994. Grade level meetings with students followed and a parent and community presentation was given at an open forum. The Board adopted the proposed 4x4 block schedule on Monday, March 13th, 1995.

This study's sample consists of 19 out of the 57 students who entered the subject school as freshmen in 1993-94 and graduated in 1996-97. This sample was chosen by taking every third student alphabetically. This sample will be used to compare the student's G.P.A. and failure rate in 1993-94, 1994-95(traditional schedule) and 1995-96, 1996-97(block schedule). This study will also look at the entire student population of 276 students at the subject school from 1993-2000.

METHODOLOGY

School records before and after the introduction of block scheduling will be compared to study the long-term effect of the 4X4 block schedule. Pooled data, for the entire student body, compiled over two years under the traditional schedule(i.e. 1993-94, 1994-95) will be compared with pooled data compiled over five years under the block schedule(i.e. 1995-96, 1999-00). All G.P.A. scores were compiled each year

by the school's principal and the means will be compared. The failure rate was computed by the school's principal also, which is based on the total number of grades that are F's and then converted to a percentage. The drop-out rate has been reported in the school's annual report each year. ACT scores have also been reported in the school's annual reports for students that took the test. The number of student disciplinary infractions has been compiled by the school's principal.

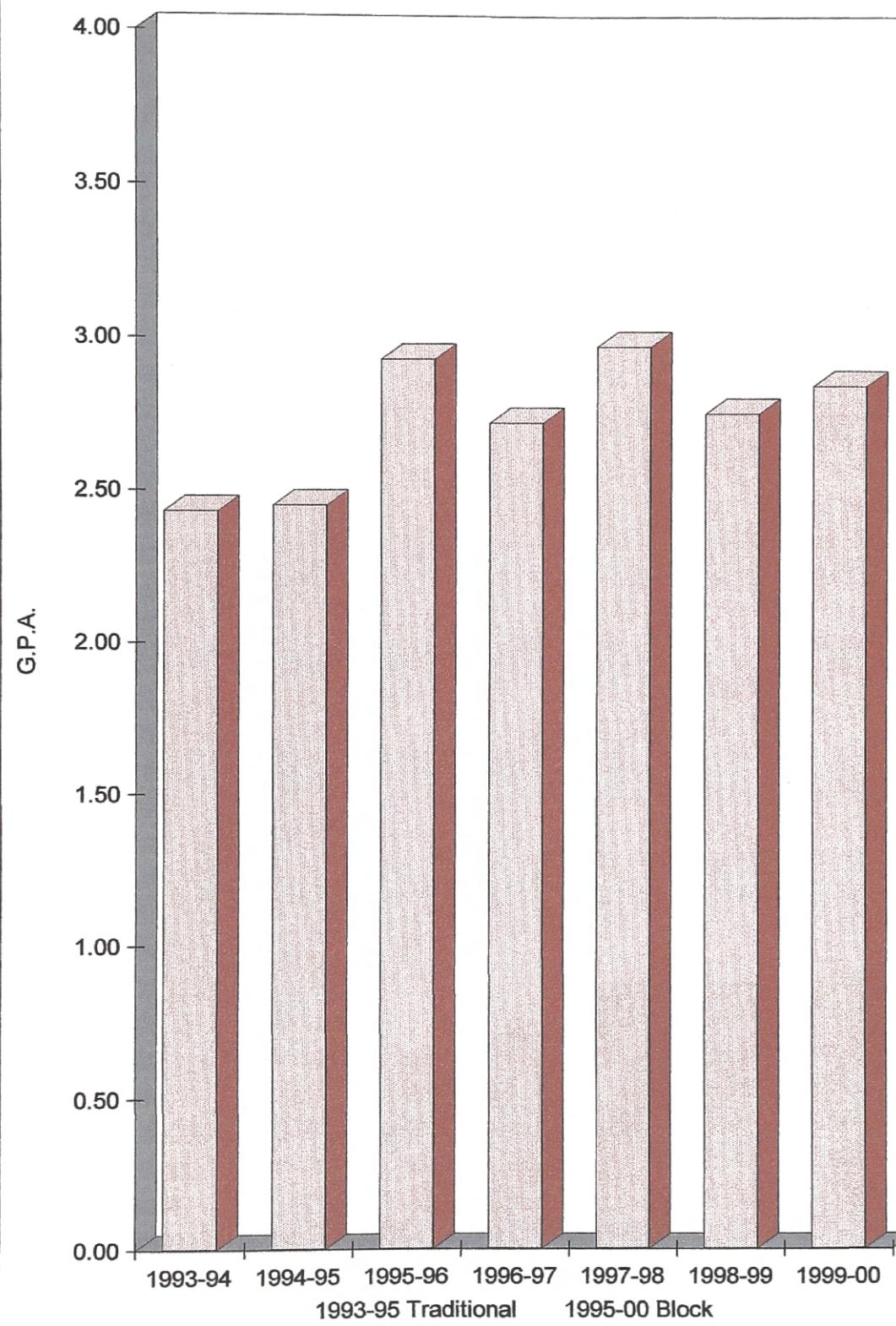
Findings

The school wide G.P.A. went up slightly under the 4x4 Block Schedule. The school wide G.P.A. in 1993-94 was 2.43, in 1994-95 it was 2.45. These two years are under the traditional schedule. In 1995-96, after the implementation of the 4x4 block schedule, the school-wide G.P.A. rose to 2.93. Every year for the first five years after the 4x4 block schedule was implemented a higher G.P.A. was recorded than the previous two years under the traditional schedule. (**see Figure 1**)

The school wide failure rate dropped dramatically after the implementation of the 4x4 block schedule. The school wide failure rate was steadily in the 30-35% range under the traditional schedule. The first year the 4x4 block schedule was introduced, 1995-96, the school wide failure rate dropped to 5%. For the next four years after that it held around 7%. A dramatic improvement, in which the teachers and administrators had hoped for, was found under the 4x4 block schedule. (**see Figure 2**)

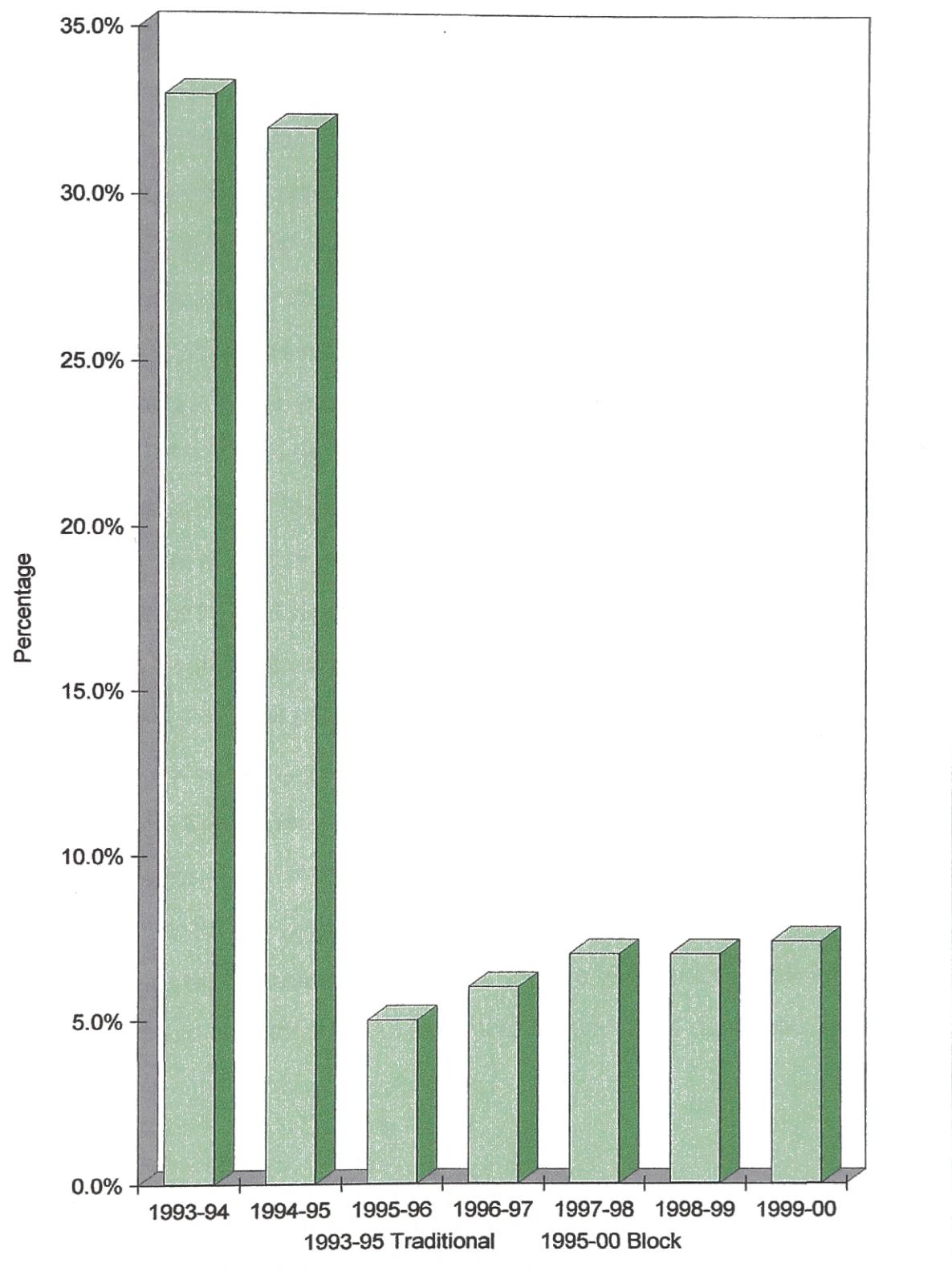
Grade Point Averages

Figure 1



Failure Rates

Figure 2

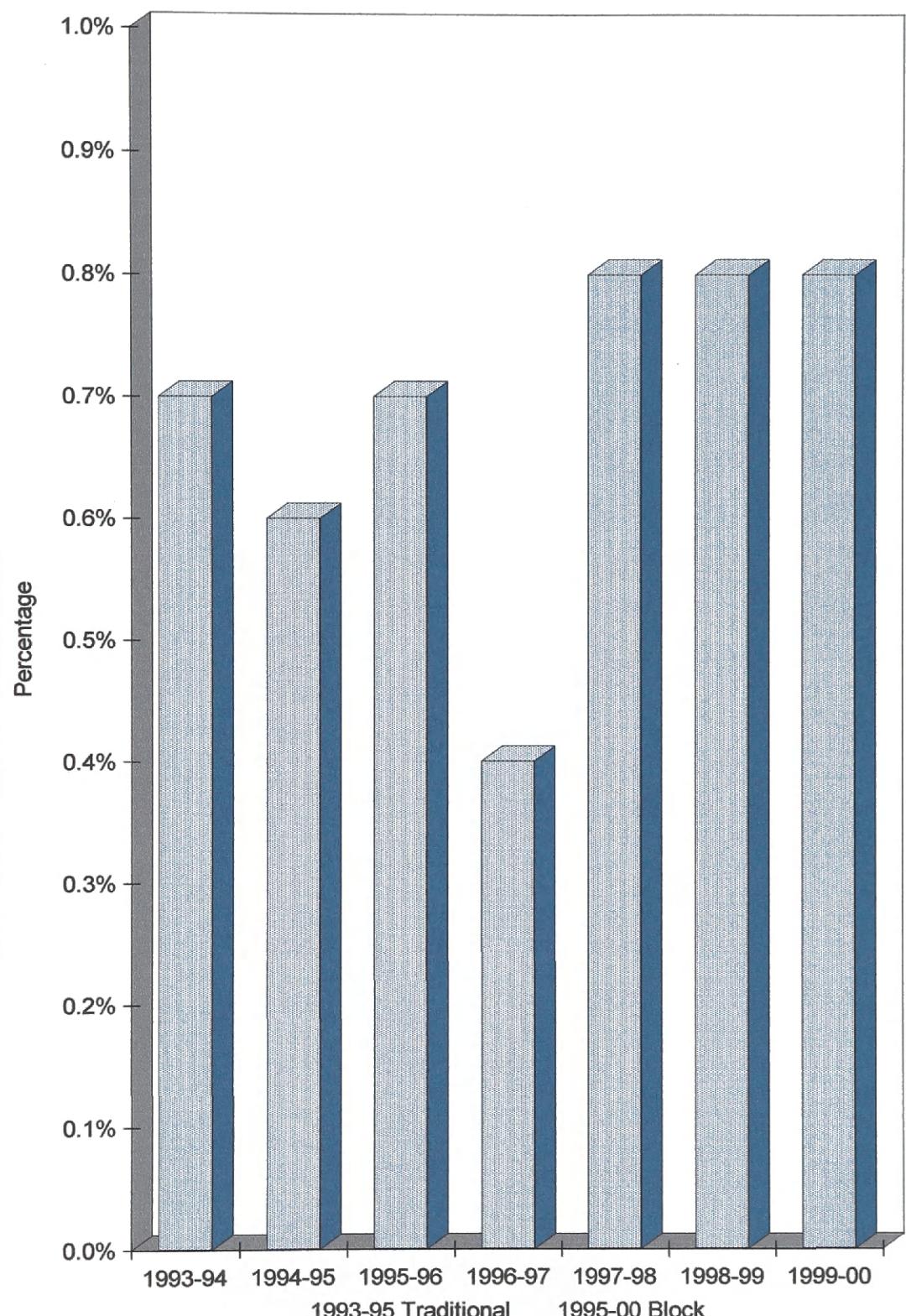


The school wide drop out rate remained low and steady under both the traditional and 4x4 block schedule. In 1993-94 and 1994-95, both under the traditional schedule, the drop out rate was .7% and .6%, respectively. That represents two students that dropped out in each of those two years. In 1995-96, the start of the block schedule, the drop out rate was .7% representing two students dropping out also. In 1996-97, the drop out rate was .4% representing one student dropping out. In 1997-98, 1998-99, and 1999-00 the drop out rate was .8% each year representing two students dropping out each year. The school wide drop out rate has never been a concern at the subject school since it is under 1% on the average and it stayed consistent after the implementation of the 4x4 block schedule. (**see Figure 3**)

The ACT composite scores increased slightly after the first year of implementation of the 4x4 block schedule. The mean composite ACT score in 1993-94 was 20.0 and the following year, 1994-95, it was 19.9. The first year of the 4x4 block schedule, 1995-96, the mean composite score dropped to 19.5. Students take the ACT their junior or senior year so these students had most of their learning take place under the traditional schedule. Over the next four years the scores increased from 21.4 to 21.7. These are slightly better compared to the two years prior to the 4x4 block schedule. It would be interesting to see if this upward trend continues. (**see Figure 4**)

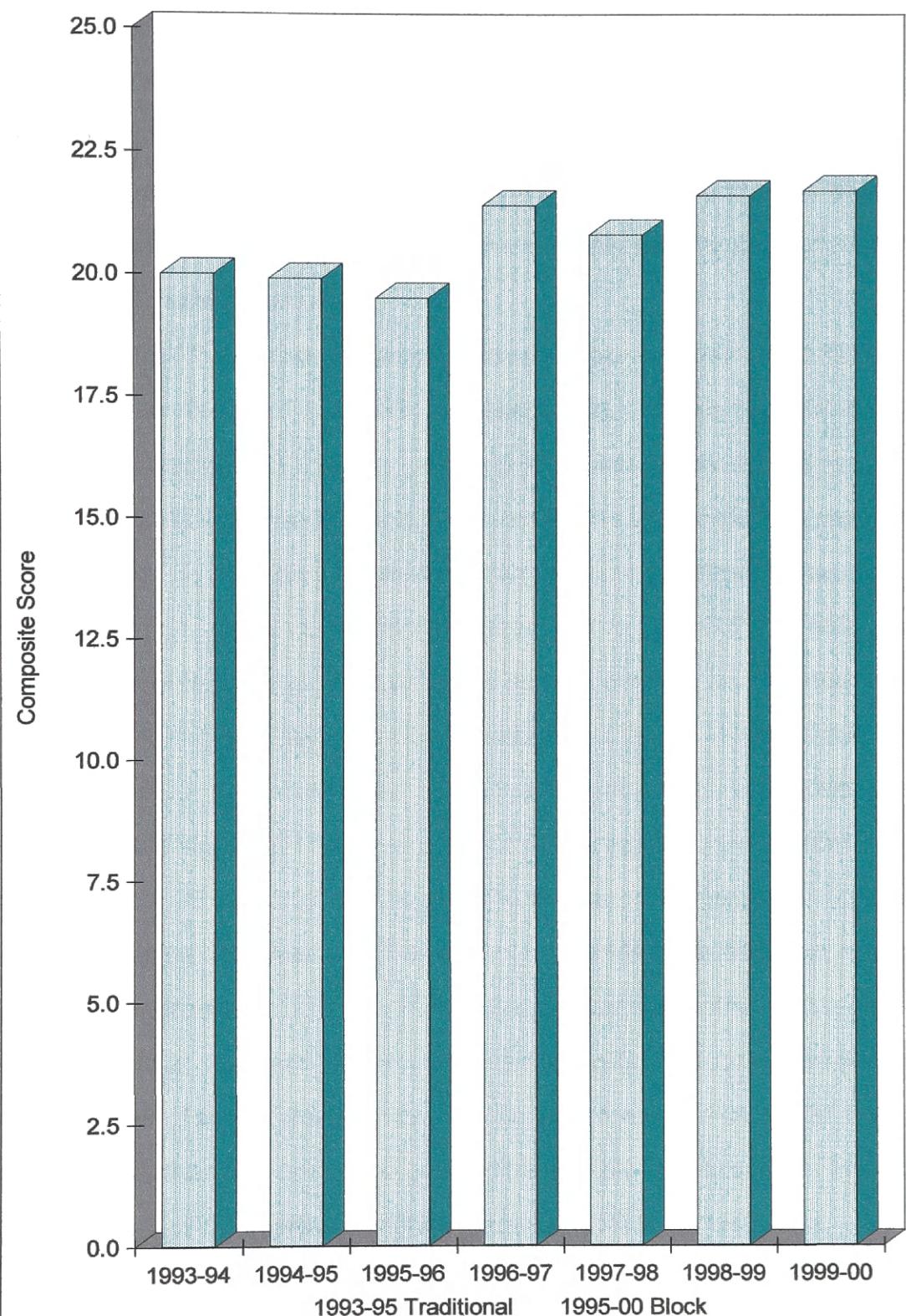
Drop Out Rates

Figure 3



ACT Composite Scores

Figure 4

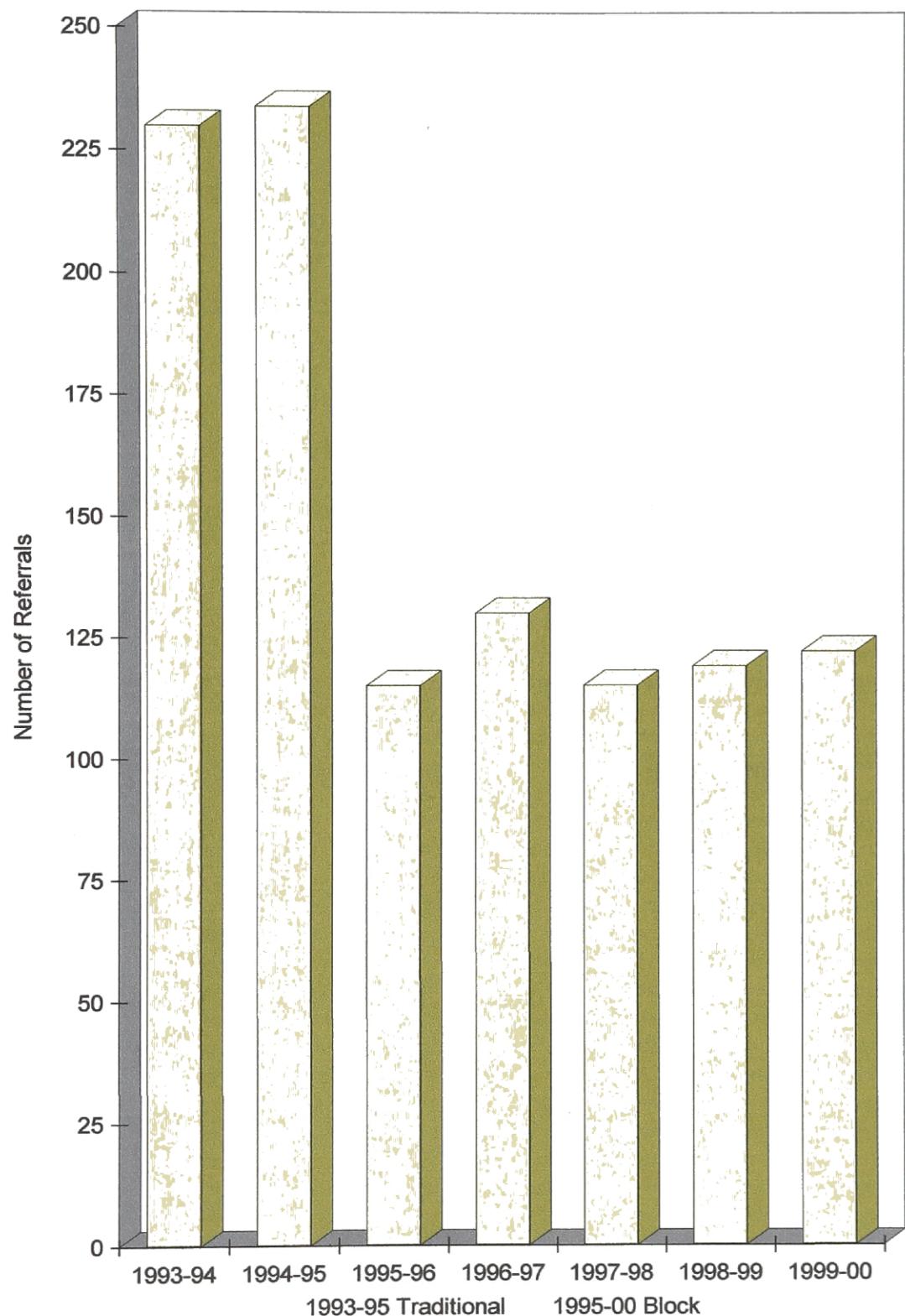


Student discipline referrals were cut in half after the implementation of the 4x4 block schedule. During the two years data was compiled under the traditional schedule there were over 225 discipline referrals per year. After the 4x4 block was implemented that number dropped to 115 and remained around there for the next 4 years. Student passing time between classes in the hallway was cut in half under the block schedule; class size remained the same, but teachers were only responsible for three classes rather than six. (**see Figure 5**)

*Thirteen of the nineteen sample students improved their mean G.P.A. during the two years on the 4x4 block schedule, (**Tables 1 & 2**).* These two tables show each of the 19 sample students' G.P.A. per year and the mean G.P.A. for the two years they were on the traditional schedule and the mean for the two years they were on the 4x4 block schedule. Table 2 also shows the change in the traditional mean G.P.A. and the block mean G.P.A. When analyzing students' year to year G.P.A.(Table 1) during the traditional schedule and the block schedule student #'s 1, 5, and 15 had a dramatic improvement during their last year using the block schedule. Each of those students increased their G.P.A. by more than a point, which represents a full letter grade. Student #10 had significant improvements once the block schedule started. He/she jumped from a 1.39 to a 2.52 G.P.A. after the first year the block was implemented. This represents an improvement of a whole letter grade. The next year student 10 improved again from a 2.52 to a 2.97. He/she jumped up another half a grade. When analyzing Table 2, 13 out of 19 improved their mean G.P.A. during the two years on the 4x4 block. Half of the six that did not improve their mean G.P.A. under the block only went down less than one tenth of a point. This sample is indicative of how the whole student body's G.P.A. improved slightly under the 4x4 block schedule.

Discipline Referrals

Figure 5



Sample Students G.P.A. 1993-94,94-95(Traditional) & 1995-96,96-97(Block): TABLE 1

Student #	1993-94	1994-95	1995-96	1996-97
1	1.53	1.64	1.33	2.72
2	1.86	1.36	1.88	2.00
3	2.79	1.87	NA	2.92
4	3.64	3.93	3.69	3.79
5	1.08	1.21	1.12	2.56
6	3.06	3.03	3.52	3.78
7	2.93	2.64	NA	2.54
8	1.44	0.93	1.05	2.45
9	0.83	1.67	1.39	2.39
10	1.33	1.39	2.52	2.97
11	2.61	3.45	3.50	3.92
12	3.24	2.81	3.00	2.87
13	3.41	3.91	3.73	3.08
14	1.81	2.48	3.00	2.67
15	1.18	1.47	1.50	2.63
16	3.76	3.97	3.79	3.70
17	1.72	2.33	2.89	2.58
18	2.19	3.21	3.26	3.06
19	3.33	3.66	3.67	3.43

Comparison of G.P.A. Means for 1993-94,94-95(Traditional) & 1995-96,96-97(Block) : TABLE 2

Student #	Trad. Mean	Block Mean	Change in Means
1	1.59	2.03	0.44
2	1.61	1.94	0.33
3	2.33	2.92	0.59
4	3.79	3.74	-0.05
5	1.15	1.84	0.69
6	3.05	3.65	0.60
7	2.79	2.54	-0.25
8	1.19	1.75	0.56
9	1.25	1.89	0.64
10	1.36	2.75	1.39
11	3.03	3.71	0.68
12	3.03	2.94	-0.09
13	3.66	3.41	-0.25
14	2.15	2.84	0.69
15	1.33	2.63	1.30
16	3.87	3.70	-0.17
17	2.03	2.58	0.55
18	2.70	3.06	0.36
19	3.50	3.43	-0.07

13/19 improved their G.P.A. under the 4x4 block

*Eight of the nineteen sample students remained at a 0% failure rate and the other 11 sample students decreased their mean failure rate substantially during the 4x4 block schedule, (**Tables 3 & 4**). These two tables show each of the 19 sample students failure rate per year and the mean failure rate for the two years they were on the traditional schedule and the mean for the two years they were on the 4x4 block schedule. Table 4 also shows the change in the traditional mean failure rate and the block mean failure rate. When analyzing Table 3 student #'s 1, 5, 8, 9, and 15 had high failure rates during the traditional schedule and even in the first year of the block schedule, but they all recorded a 0% failure rate their second year on the 4x4 block schedule. This is a dramatic improvement for those students. Also in Table 3 student #'s 3, 10, and 14 showed significant improvements under the 4x4 block schedule. Each of these three students had significant failure rates under the traditional schedule, but none of them failed a single class under the block schedule. When analyzing Table 4 all of the 19 sample students improved their failure rate under the 4x4 block schedule or remained at 0%.*

Sample Students Failure Rate 1993-94,94-95(Traditional) & 1995-96,96-97(Block): TABLE 3

Student #	1993-94	1994-95	1995-96	1996-97
1	25.0%	21.4%	16.7%	0.0%
2	16.7%	42.9%	21.4%	6.7%
3	0.0%	23.1%	0.0%	0.0%
4	0.0%	0.0%	0.0%	0.0%
5	41.7%	42.9%	42.9%	0.0%
6	0.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	NA	0.0%
8	33.3%	42.9%	35.7%	0.0%
9	41.7%	22.2%	27.3%	0.0%
10	25.0%	16.7%	0.0%	0.0%
11	0.0%	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%	0.0%
13	0.0%	0.0%	0.0%	0.0%
14	8.3%	7.1%	0.0%	0.0%
15	0.0%	20.0%	16.7%	0.0%
16	0.0%	0.0%	0.0%	0.0%
17	8.3%	0.0%	0.0%	0.0%
18	8.3%	0.0%	0.0%	0.0%
19	0.0%	0.0%	0.0%	0.0%

Comparison of Failure Rate Means for 1993-94,94-95(Trad.) & 1995-96,96-97(Block) : TABLE 4

Student #	Trad. Mean	Block Mean	Change in Means
1	23.2%	8.4%	-14.8%
2	29.8%	28.1%	-1.7%
3	11.6%	0.0%	-11.6%
4	0.0%	0.0%	0.0%
5	42.3%	21.5%	-20.8%
6	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%
8	38.1%	17.9%	-20.2%
9	32.0%	13.7%	-18.3%
10	20.9%	0.0%	-20.9%
11	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%
13	0.0%	0.0%	0.0%
14	7.7%	0.0%	-7.7%
15	10.0%	8.4%	-1.6%
16	0.0%	0.0%	0.0%
17	4.2%	0.0%	-4.2%
18	4.2%	0.0%	-4.2%
19	0.0%	0.0%	0.0%

8/19 remained at 0% & 11/19 improved under block

Conclusion

The object of this study is to determine the effect of introducing the 4x4 block schedule in the subject school on students' grades, failure and drop-out rates, ACT scores, and disciplinary referrals. In reviewing the data collected at the subject school, the 4X4 block schedule has positively affected the students' G.P.A.'s, failure rate, ACT composite scores, and student discipline referrals. The drop-out rate has remained low.

Some of the intrinsic factors of the 4x4 block schedule that are believed to have played an important part in making the subject schools student achievement improve and student discipline referrals drop are:

- 1) The students only have four instead of seven classes at one time.
- 2) The students have more in class time to ask questions and get one-on-one help.
- 3) The students have only four instead of seven different teachers at one time.
- 4) There is less passing time in the hallways between classes.

The first two factors listed above played an important role in student academic achievement improving. With only four subjects to focus on and more one-on-one instruction available students have performed better academically. The last two factors listed above played an important role in the number of student disciplinary infractions and school climate. With less teachers to get to know and understand their rules and less passing time in the hallways (which is when many disciplinary problems arise) there were less disciplinary problems creating a better school climate.

After analyzing the prominent factors discussed above, it appears that the 4X4 block schedule must play a large role in contributing to the positive change in the students' G.P.A's, failure rates, drop-out rates, ACT composite scores, and discipline referrals. However, we must consider that there may be other factors that contributed to the change in these variables. For example, we are looking over a period of seven

years and many things may have changed in the subject school during that period of time other than just the schedule. Some of these could involve, change in staff, change in student profiles, change in ACT, change in attitude of staff, students, and community members, and change in amount of staff development offered and accepted. All of these variables need to be considered.

It is important for the subject school to continue to monitor their performance. Hopefully the changes that have been found so far will continue to improve. There is sufficient evidence that so far the 4X4 block schedule has been a very effective schedule change for the subject school. This does not mean that all schools should change their current schedule to the 4X4 block schedule. Many more studies would have to be done. This is just one study where the school has benefitted from changing their school schedule, but it is not a cure all and each individual school must assess its needs before making a schedule change.

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