

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

The purpose of this study was to compare the effects of the 7-period alternating day schedule, the 4 x 4 block schedule, and the traditional single-period schedule on the Virginia Standards of Learning end-of-course tests for high schools. This chapter presents a summary, conclusions, and discussion of the results of the study; and provides recommendations for practice and for further research.

Summary

The pressures placed upon the public schools by the current reform movement have caused superintendents and principals alike to focus on solutions that provide maximum benefits for improved student learning. One such reform movement is currently underway in the Commonwealth of Virginia. Since 1995, the Virginia reform movement has focused in part on measures that assess student achievement as well as ensure accountability for the achievement. Securing more time for teaching and learning is one such perceived solution to this reform movement. At the core of the reform is the need to restructure the high school to ensure that all students are prepared to compete in the twenty first century as technologically literate and informed citizens in a democracy that has no traditional boundaries. Proponents of the restructuring of the high school have argued that with the manipulation of time within the school day, it is possible to deliver an educational product that is closely aligned with rigorous academic standards and improved student achievement. Block scheduling, the use of extended periods of time for learning, is one response to the call for the restructuring of the high school.

Research (e.g., Guskey & Kifer, 1995; Veal & Flinders, 2001) supports the fact that high schools experience the most success with block scheduling when parents, teachers, and students

are involved with the change process. In fact, most of the research on block scheduling involves the implementation phase of the schedule during the first one or two years. These studies confirmed that during this time the scheduling had a positive impact on school climate, provided teachers the opportunity to improve and to expand their instructional strategies, reduced discipline referrals, and improved student attendance (Deuel, 1999; Guskey & Kifer, 1995; Mutter, Chase & Nichols, 1997). Research also confirmed that student' grade point averages and the number of students on the honor roll increased (Brown & Schatten, 2000; Eidner, & Bishop, 1995). However, there was limited evidence that supported the effect of high school scheduling on student academic achievement as measured by standardized criterion-referenced tests.

While much of the research on block scheduling has been optimistic regarding the benefits for student achievement, limited research has been reported that actually confirms that these benefits are being achieved. Most of the studies have focused on the perceived benefits by teachers and students (Cobb, Abate, & Baker, 1999; Reid, 1995; Veal & Flinders, 2001). Although this information is valuable, it does not inform educational leaders on the potential of the block scheduling models for improving student achievement. At a time when accountability for improving student achievement in terms of rigorous academic standards is pivotal, such a study is needed. Therefore, this study adds to the research by comparing differences in student achievement between three scheduling models on the Virginia Standards of Learning end-of-course tests.

This study included 261 high schools in Virginia using a 7-period alternating day schedule, a 4 x 4 block schedule, or a traditional single-period schedule. In Virginia during the 2000-2001 school year, there were three leading forms of high school scheduling. The first was the 7-period alternating day schedule that comprised 29.5% of the high schools. The second was

the 4 x 4 block schedule that comprised 31.1% of the high schools. The third was the traditional single-period schedule that comprised 26.5% of the high schools. The mean scaled scores for the Virginia Standards of Learning (SOL) end-of-course tests as reported for each high school were used to compare the schedules. Surveys (see Appendix B) were distributed to the principals of each of the high schools to gain information about schedule type, school location, and school size. In addition, the survey requested the high school principals to identify the core content area that had embraced the block schedule and the core content area that had difficulty adjusting to the block schedule. Seventy-five percent of the principals responded to the first mailing. Many principals noted requests for the results of this study upon completion. For the most part, principal inquiries focused on questions regarding the type of block schedule other than the one they had adopted. A total of seventy-eight percent of the principals responded to the survey after the second mailing.

Each high school included in this study was identified as having used the specified schedule for three or more years. Additionally, the 2000-2001 SOL test administration was the third complete year for high schools to administer the SOL end-of-course tests during the summer, fall, and spring. During the 1997-98 school year the SOL end-of-course tests were not administered to the entire student population of high schools using a 4 x 4 block schedule. The tests were only administered to students enrolled in a second semester course in those high schools during that year.

This study was designed to address four research questions, which attempted to determine the effects of the different schedules on the Virginia Standards of Learning (SOL) end-of-course tests.

1. Is there a significant difference among high schools using a 7-period alternating day schedule, a 4 x 4 block schedule, or a traditional, single-period schedule for three or more years with respect to the mean scaled scores on the Virginia SOL end-of-course tests?
2. Is there a significant difference among high schools in an urban, suburban, or rural location with respect to the mean scaled scores on the Virginia SOL end-of-course tests?
3. Is there a significant interaction between schedule type (7-period alternating day, 4 x 4 block, traditional) and school location (urban, suburban, rural) with respect to the mean scaled scores on the Virginia SOL end-of-course tests?
4. Are there any content areas (English, history, mathematics, and science) that appear to be positively or negatively affected by one block schedule as compared to the other?

Conclusions

The results of this study indicated that a block schedule format found in Virginia public schools accounts for some significance when comparing mean scaled scores on six SOL end-of-course tests. The mean scaled scores for the 7-period alternating day schedule were significantly higher than the mean scaled scores on the 4 x 4 block schedule on the English: Reading, English: Writing, and geometry end-of-course tests. In addition, high schools using a 7-period alternating day schedule and a traditional single-period schedule scored significantly higher on the English: Writing SOL end-of-course test. Since the results for the English tests, the English: Reading and the English: Writing, were similar; it appears that the 7-period alternating day schedule has merit in terms of English instruction.

The results of this study also indicate significant improvement in one area of mathematics, geometry. The insignificant results for Algebra I may be due to the limitation noted in Chapter 1. The strongest mathematics students generally take Algebra I while in middle school. It may also be related to the fact that all schools regardless of the schedule type have initiated a two-part Algebra I program. Students do not take the SOL end-of-course test until they complete Algebra I, part II. Therefore, all three schedule types have doubled the instructional time for Algebra I.

This study also analyzed the effect of the SOL test scores on school location by comparing the high schools in urban, suburban, and rural locations. Data analysis revealed that many of the 7-period alternating day scheduled high schools (63%) included in this study were located in a suburban area while most of the 4 x 4 block scheduled high schools (74%) were located in a rural area. When comparing the mean scaled scores for high schools based on school location, high schools in a suburban location scored significantly higher than high schools in a rural location on the English: Reading and English: Writing SOL end-of-course tests. Additionally, high schools in a suburban location scored significantly higher than those in an urban or rural location on the geometry and United States History end-of-course tests. Finally, high schools in a suburban and rural location scored significantly higher than those in an urban location on the Earth Science end-of-course test.

In 5 out of 6 SOL end-of-course tests, significance was found in favor of the suburban high schools. A possible explanation is the fact that suburban localities typically attract families of higher socio-economic status (SES). SES as a predictor of high student achievement is well documented. However, it was not chosen as a variable for this study because it is a difficult measure for a study of high school students. SES is often measured by the percentage of students

enrolled in free- and reduced- lunch programs. Many high school students do not participate in those programs because of peer pressure. As an alternative, future studies may want to include the wealth of a school or school community as a controlling variable.

There was no significant interaction between schedule type and school location. With only 17 high schools (8%) included in this study identified as urban, it was difficult to draw a conclusion of the schedule type of choice for these schools. Furthermore, the small cell size of the urban schools by schedule type (7 A-B, 4 x 4 block, traditional) may be an additional limitation to this study as it may compromise the interaction effects of schedule type and school location. The small cell size was a concern of this researcher, as the urban schools are the high schools that have been affected the most by the current reform initiative. There is a need to identify scheduling models as well as instructional practices that best meet the needs of the students attending the urban schools in the Commonwealth of Virginia as well as in the United States. It is imperative that these scheduling models and instructional practices be based on the most current scientific research in the area of study.

In the survey (see Appendix B) high school principals were asked to identify the content area that had embraced the block schedule and the content area that had difficulty with the block schedule. Principals were asked this question to determine if one schedule type was better suited for one particular content area as opposed to using just one schedule type for all content areas in a high school. Results of the survey indicated that science was the content area that embraced the block schedule the best for both the 7-period alternating day and the 4 x 4 block. It can be inferred from these results that science teachers like the longer blocks of time for conducting longer laboratory experiments.

The results of the survey also indicated that mathematics was the content area that had difficulty adjusting to the 7-period alternating day schedule. Again, it can be inferred that mathematics teachers want to see their students every day. Mathematics teachers identify retention from class to class as an issue regarding the alternating day model of block scheduling (Gilkey & Hunt, 1998). However, this perception was not substantiated in this study. When the mean scaled scores for geometry were compared among schedule types, the 7-period alternating day schedule had the highest mean scaled score among the high schools included in this study.

Social studies was the content area identified as having the most difficulty with the 4 x 4 block schedule. Most social studies teachers blame the intensity and compacting of the curriculum required by the 4 x 4 block schedule for the low SOL end-of-course test scores in United States History. Rettig and Canady (1999) concur that it is not uncommon for principals to report that social studies teachers experience difficulty moving away from teaching factual information to a more conceptual way of teaching. This study, however, found no significant difference among high schools using the 7-period alternating day, the 4 x 4 block, or the traditional single-period schedules.

Discussion

The findings of this study are comparable to other studies regarding student achievement during the implementation phase of a block schedule. The North Carolina Department of Public Instruction (NCDPI, 1999) reported that the 4 x 4 block schedule had little impact on end-of-course tests in the state during the first two years of implementation. However, the NCDPI stated that the length of time a school was using a block schedule did begin to influence the results on the end-of-course tests. Some findings, such as in English achievement, suggested potential improvement in the use of the block schedule (NCDPI, 1999). Moreover, the results of the

current study also support Reid (1995) who reported perceived improvements in writing ability in block scheduled English classes.

The current study is conflicting to McCreary and Hausman (2001) who compared achievement of high school students in one urban school district using either a 7 A-B, 4 x 4 or trimester schedule. Students in the 4 x 4 schedule scored significantly higher on the Stanford 9 math test than students in the 7 A-B or trimester schedules. Additionally, Guskey and Kifer (1997) found no significance on end-of-course tests at one high school when comparing the scores of students on the block schedule to the scores of students the previous year when the school used a traditional schedule. The comparison of McCreary and Hausman, Guskey and Kifer, and the current study reinforces the fact that more research is needed especially for those schools in an urban location. Perhaps future studies may include norm-referenced tests such as the Stanford 9 rather than criterion-referenced tests. Although, it must be noted, the state criterion-referenced tests such as the SOL in Virginia is the assessment used by state and national accountability efforts.

It appears that the rearranging of the school day by itself with the use of one schedule will not guarantee improved test scores. The current study did not produce sufficient evidence to support the use of one particular schedule over another in all core content areas. Indeed, as McCreary and Hausman (2001) concluded, administrators must think beyond structural changes and consider other factors such as curriculum alignment, instructional practices, and professional development. However, this study does suggest that block scheduling can be designed to support the learning process in the high school. The schedule itself must be tailored and constructed to meet the individual needs of the learner as well as the school community. The new scheduling model may be the combination of two or more schedules. Many 4 x 4 block-scheduled schools

are now beginning to accommodate yearlong and alternating day schedules within the 4 x 4 structure. Such accommodations address certain content related requirements such as the fact that mathematics teachers want to see their students every day all year long and that science teachers want more time to integrate laboratory experiments within instruction. These kinds of accommodations hold the key to establishing the flexibility in scheduling to make the most out of the components educators like of the alternating day, 4 x 4, and traditional schedules.

Recommendations for Practice

Division and school leaders will want to continue to explore the effects of the 7-period alternating day schedule on English and mathematics courses. English: Reading, English: Writing and geometry showed significance for high schools using this schedule type. The insignificant results for Algebra I may be due to the limitation noted earlier but still warrant consideration.

Superintendents and principals must work together with teachers to design and to develop creative schedules that provide maximum learning experiences for all students in an environment free of stress and with time to utilize the most effective instructional strategies available. Block scheduling has great potential, but it must be based on scientific research that demonstrates its effectiveness as one component for success in the current reform movement. The success may necessitate a fusion of several schedules that match the subject area with the needs of the learner. A planned and properly designed high school schedule, when implemented in combination with successful instructional practices may result in improved student achievement for certain schools and for certain students within those schools.

The Standards of Learning (SOL) assessments are a unique measure of student achievement in the Commonwealth of Virginia. The end-of-course assessments are criterion-

referenced tests that measure the extent to which students in Virginia have mastered the objectives of these content specific standards. For this reason, it may be difficult to make implications regarding the results of this study beyond the Commonwealth of Virginia.

Recommendations for Further Study

1. Conduct additional studies of the effects of high school scheduling and the Virginia SOL end-of-course tests over a longer period of time (e.g., every three years).
2. Conduct a study to determine the effects of one type of block scheduling (7-period alternating day or 4 x 4) for different groups of students. Such a study might determine whether the scores on the end-of-course tests are higher for groups of students identified by quartiles based upon cumulative grade-point average.
3. Investigate how urban high schools are manipulating time to increase student achievement. This study should identify the steps urban schools are taking to master student achievement as measured by criterion-referenced tests and to determine if the steps have been successful.
4. Study, qualitatively, how teachers use blocks of time in the classroom and quantitatively, how these practices effect student achievement in terms of a norm-referenced standardized test.
5. Identify high schools that consistently produce high mean scaled scores as well as consistently report low mean scaled scores, and determine whether variables other than schedule type explain the difference between high performing and low performing schools.
6. Investigate the reason why more rural schools have implemented the 4 x 4 block schedule and why more suburban schools have implemented the 7-period alternating day schedule.
7. Study the effect of the wealth of a school or school division on student achievement in the 7-period alternating day and the 4 x 4 block schedules.

8. Investigate how the quality and quantity of staff development effects student achievement in the 7-period alternating day and 4 x 4 block scheduled schools.
9. Study the effect of school size on student achievement in block scheduled schools.

Research Reflections

Participating in this study has provided this researcher with insight and respect for the research process. Although former researchers had cast a cloud of apprehension on a research project that involved a survey of high school principals, this researcher found the survey process to be quite invigorating. The response rate during the first mailing was more than encouraging. As noted earlier, a total of seventy-eight percent of the principals responded to the survey, and many of the principals commented on the need for such a study on block scheduling. It really felt good to hear that this was a research topic that was of interest to educational practitioners. Moreover, the high school principals noted requests for the results of this study upon completion. Overall, the principals responding to the survey provided encouraging remarks and showed an interest in block scheduling. The timing of the mailing of the survey may have been one contributing factor to the successful response rate. The first mailing took place during the first week in February. This may be a good time for high school principals, especially those on the 4 x 4 block, since the second semester was underway and the first round of end-of-course testing had been completed. This researcher also found encouragement from the Virginia Department of Education (VDOE). The VDOE Division of Assessment and Reporting was most cooperative in providing the test data needed for this study. However, future researchers are forewarned that although data may be acknowledged as available, it is best not to assume that the data are readily available at a moment's request.

In this current era of reform, educational leaders must continue to identify ways to meet the needs of all students, the gifted learner on one hand and the reluctant learner on the other. Indeed, as the National Commission on the High School Senior Year proposed, educators must provide a range of educational alternatives for all students. Due to the opportunities provided by block scheduling, all students can experience a wide array of positive innovations. Hopefully, the results of this research study will provide educational leaders with support to utilize block scheduling as more than just a structural reform. To be effective in this new age of reform and accountability, high school block scheduling must be employed as an instructional reform that fosters student academic achievement.

As a new century unravels, the question of time and how it is used for student learning will continue to be a major focus. In preparing a high school schedule tailored to the needs of all student learners, we must now move away from comparing one high school schedule to another, for one size does not fit all in the teaching and learning process. The high school schedule of the twenty first century may very well be a combination of schedules past and present.