This study provides an overview of the issues science teachers faced in the 2006-07 school year with the change to the block schedule in Wake County, North Carolina. The purpose of this research was to address gaps in literature related to changes teachers had made in their instruction and interaction with students after the implementation of the block schedule. The mixed methods used were a survey instrument, followed by eight focus group interviews. Data Analysis included t-tests, correlations, and triangulation through a phenomenological approach. Results obtained were a difference in methods used by teachers with End-of-Course tests when compared with Non-End-of-Course tests in the areas of outdoor activities, projects, media center visits, and guest speakers. Teachers with more experience also tended to change instructional methods less on the block schedule. Conclusions drawn include state testing negates some benefits of block scheduling including those to curriculum, learning, and student relationships.
Science and Block Scheduling: An Analysis of Teacher Experiences in Wake County, North Carolina

by
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DEDICATION

I would like to dedicate this dissertation to my parents, Earl and Carolyn Jones, who supported and listened tirelessly to me on this dissertation journey. I would also like to recognize my high school teachers who developed my interest in science (Mr. John Mummey, Mr. James Larson, Mr. Fred Kingrey, Mr. David Brown, and Mr. Ted Williams), and to Ms. Penni Meyer, National Honor Society Advisor, who provided me with many tutoring experiences that geared my interests toward teaching. Finally, this is dedicated to Mr. John Kuehn, my senior English teacher who taught me the writing skills I needed to complete this dissertation.
Ms. Carrie Jones was born in Dayton, Ohio, where she attended Kettering City Schools from K-12. She attended Ohio State University where she earned a B.S. in Biology and a M.Ed. in Science Education. She student taught at South High School (Columbus City Schools), Bexley Middle School, and Heritage Middle School in Westerville, Ohio. Ms. Jones chose to move to North Carolina for multiple reasons, including family ties, job outlook, and the prospect of new adventures. After a year in Cumberland County schools, she decided she missed attending classes and living in a college town. Ms. Jones took a job at Centennial Campus Middle School, teaching seventh and eighth grades, in Wake County in 2000. When Middle Creek High School opened in 2002, she took the ninth-grade Earth Science and later, the Department Chair position, where she has been since. Ms. Jones has been actively involved with the NC Science Teachers Association, Kenan Fellows Program, NC Virtual School, NC Science Leadership Association, and various committees at NC Department of Public Instruction. She has received several grants and awards, including North Carolina Earth Science Teacher of the Year (2006), K-12 Marine Science Educator of the Year (2007), Sigma Xi Outstanding Science Educator (2008), and The Ohio State University Young Educator Award (2008). Upon completion of her degree, she plans to remain in the classroom, where students need her most.
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CHAPTER 1 – INTRODUCTION

Lost Time is Never Found Again. ~ Ben Franklin

Time in Schools

How to best use time in schools has been a longstanding dilemma because everyone involved in educating students competes for that time. Administrators vie for maximum test preparation, teachers contend with the difficulties of covering curriculum, and parents battle for more family time. Time is one of the key factors in planning and implementing curricula, regardless of the content area (Benton-Kupper, 1999). It determines class schedules, shapes the curriculum, influences teaching, and facilitates the interactions of teachers and students (Northeast and Islands Regional Educational Lab, 1998). When school programs make efficient use of time, the climate of the school improves and the opportunities for learning increase (Shortt & Thayer, 1999). Time also determines the amount of exposure to instruction that a student will have, thus impacting the quantity of concepts and skills introduced to students (Shortt & Thayer, 1999). The block schedule may be advantageous in maximizing this learning time because of the extended time period each day, yet disadvantageous because it reduces the total contact time overall compared to the traditional schedule.

The block schedule is a reform strategy that arose from the ongoing debate regarding how time is best utilized in the school day. A school’s schedule is
important because it may or may not permit the effective use of time, money, people, and space in promoting a positive school climate. A school schedule is not simply a way to organize a school day; it is a way to organize student learning (Kienholz, Segall, & Yellin, 2003). In addition, within the school schedule resides the power to address problems, facilitate the successful implementation of programs, and support effective instructional practices (Canady & Rettig, 1995). Consequently, a well-crafted schedule can result in more desired programs and instructional practices (Lewis, 1999). In contrast, if not effectively utilized, a school’s schedule can add to unnecessary stress and wasted resources, and potentially generate mass confusion (Canady & Rettig, 1995). Some professional educators believe that curriculum should drive the schedule rather than the schedule dictating the curriculum and the method of delivery (Shortt & Thayer, 1999). While it is tempting to classify some programs as “fads,” which seem to come and go in the education field, a schedule change may be the answer to meeting school goals and serving as a catalyst for changing the factory model on which the United States’ system was based. In an effort to better meet society’s expectations and to make better use of gained knowledge, educators are now focusing on the calendar year and time scheduled for classes (Lawrence & McPherson, 2000). However, lengthening the school year (beyond June) or school day (in terms of hours spent in school) is probably impractical given the current resource constraints in public schools (Marzano, 2003). Consequently,
block scheduling has become this catalyst for instructional change in secondary schools across the country (Canady & Rettig, 1996).

**Problems With the Traditional Schedule**

The traditional school schedule is based on the factory model of compartmentalization and specialization (Shortt & Thayer, 1997), which was appropriate for the culture of the working force at the turn of the twentieth century; however, this fragmented schedule is no longer suitable for demands today. The national average time on the traditional schedule is 51 minutes per class period (Canady & Rettig, 1995). As a result, some educators note several problems with the traditional seven- or eight-period schedule, including a wasted 15 hours of instructional time per course due to shorter classes and transitions, a shorter planning period for teachers, and having multiple classes to prepare for with six or seven class periods (Averett, 1994). Within the seven or eight class periods, more time is lost in hall changes, starting and stopping class, and time is reduced for functions such as lab clean-up and record-keeping for 120-150 students (Shortt & Thayer, 1999). In the traditional schedule, teachers, on average, spend 23% of their time on non-instructional activities (Metzker, 2003). In a traditionally scheduled school day, these abbreviated time allotments often interrupt the teaching and learning process (National Education Commission on Time and Learning, 1994).
Such schedules also affect student discipline adversely when schools release thousands of students into the hallways and bathrooms six to ten times a day for three to five minutes of chaos (Rettig & Canady, 1999). Instructionally, short periods of instructional time prohibit more in-depth treatment of content (Robbins, Gregory, & Herndon, 2000). The traditional schedule is also a difficult routine for students, forcing upon them the ramifications of having seven to eight teachers in addition to a multitude of different rules, books, tests, and homework assignments. In addition, traditional scheduling may not allow some students enough time for learning and may prevent others from accelerating (Knight, Deleon, & Smith, 1999), nor does it allow the flexibility to enable students to be as actively engaged in the learning activities in the shorter time periods (Pettus & Blosser, 2001).

**Block Schedule Defined**

One means of minimizing the negative effects of the traditional schedule is to change to a block schedule format. Block scheduling, simply defined, creates large segments of instructional time for staff and students (Robbins et al., 2000). It organizes a course around one semester of 90-minute classes instead of two semesters of 50-minute periods. There are various forms of block scheduling, including the 4X4 plan (also known as the Semester plan, Copernican plan, or Accelerated Schedule), in which students take four classes at a time for a semester; the A/B plan (also known the eight block Alternating Day, Odd/Even,
or Day 1/Day 2 plan), in which students take all eight classes every other day for a year. Other plans also exist: (1) two to three 90-minute blocks and variable or split 45-minute classes (modified block or FAN), (2) an Embedded model (mixed, hybrid, or combination, and Block with Intersession), and (3) and the Parallel Block Schedule (Delany, Toburen, Hooton, & Dozier, 1998; Queen, 2000; Shortt & Thayer, 1999). However, the most popular method of block scheduling is the 4X4 semester plan, followed by the A/B schedule (Harmston, Pliska, Ziomek, & Hackmann, 2003; Lewis, Cobb, Winokur, Leech, Viney, & White, 2003). What works for one school may not be suitable for another, depending on students, school programs, and the community focus; hence, a number of variations exist because schools can adapt the block schedule to meet their unique circumstances (Trenta & Newman, 2002). Still, the choice of one model over another may be critical to achieving effective time use in a particular school (Shortt & Thayer, 1999).

**Goals and Motivations for Block Scheduling**

Block scheduling may be the most significant reform strategy in secondary education in the latter half of the twentieth century (Lare, Jablonski, & Salvaterra, 2002). The goals and advantages of block scheduling are numerous: It has the potential to provide a curriculum with a heavier academic emphasis, an increase in graduation requirements, and an enhanced integration of technology (Mutter, Chase, & Nichols, 1997); it addresses time for planning, learning, and teaching
because of the longer time period per day (Shortt & Thayer, 1999); it provides a more flexible learning environment in schools (Schultz, 2000); and it provides more opportunities for using varied and interactive teaching methods (Irmsher, 1996). Many studies have shown results supporting the claim that block scheduling improves student achievement (Calvery, Sheets, & Bell, 1998). The professional literature also emphasizes that the schedule is highly interrelated with school climate and chosen teaching methods (Hackmann, 1995).

However, block scheduling is not without its disadvantages. The block schedule incurs a 12.5% loss of instructional time (NSTA, 1997), since direct teacher-student contact hours are reduced. Specifically, 180 days of a traditional 55-minute period equates to 165 hours, while 90 days of 90-minute class periods is only 135 hours, creating a potential loss of 30 hours per year (Averett, 1994). Considering this loss in instructional time, it is surprising that school systems have been quick to adopt the block schedule in North Carolina, where high school teachers work under the reality of required End-of-Course exams (Hurley, 1997).

By 1999, about half of U.S. high schools were utilizing some form of block scheduling (Zepeda, 1999), and block scheduling has shown increasing popularity in Virginia and North Carolina public high schools (Thomas, 2001). North Carolina principals reported that the top reasons for changing to a block schedule were (1) a greater variety of courses, (2) greater focus on fewer courses each semester, and (3) the option for students to retake classes (NCDPI, 1997).
Schools initially became interested in this plan in 1991 after the State Board of Education increased graduation requirements from 11 to 14 courses, in part because block scheduling offers students the ability to take more electives (Averett, 1994). Over the past 15 years, the use of block scheduling has risen in North Carolina from six schools (approximately 2% of all high schools) in the 1992-93 school year to 288 schools (approximately 72%) in the 1999-2000 school year (Zhang, 2001). Reports in 2005 revealed that over 90% of North Carolina high schools use the block schedule (Hui, 2005). Wake County implemented this change in 2003-04, citing several reasons: First, the district felt it needed to increase opportunities for enrollment in advanced courses, thus increasing opportunities for students to participate in more elective courses. Second, the new requirements for a diploma in North Carolina created challenges, while the North Carolina Academic Scholars Program requirements increased. Third, officials wanted to create smaller learning communities on their campuses (WCPSS, 2005).

**Conceptual Framework Underlying Block Scheduling Reform**

Although some individual faculties readily identify block scheduling as a solution for a variety of perceived problems, a few researchers state that many schools have not invested the necessary time discussing their reasons for considering this approach (Hackmann, 1999). Block scheduling is a tool to help implement a comprehensive plan to improve instruction; it should not be an end
to reform itself. Block scheduling as a stand-alone initiative has no theoretical foundation; rather, its benefits result in more opportunities to apply student-centered or constructivist methods (Hackmann, 2004). However, as secondary schools implement block scheduling, students face either longer periods of more effective, brain-compatible teaching or longer periods of less effective brain-antagonistic instruction (Fitzgerald, 1996). From an educational psychology perspective, teachers should be implementing a theory known as the “Novel Beginnings” approach in their instructional methods in order to maximize student learning. The idea is that students are more likely to remember material at the beginning and ending of an activity. This approach anticipates that, in engaging in more starts and stops, students will retain more information. Whereas under the traditional schedule a teacher may only have time to implement two or three 15- or 20-minute activities per period, under the block schedule a teacher may be able to employ up to six. With block scheduling, there is time to incorporate more of these activities throughout teachers’ lessons. A “BME” or “beginning-middle-end” principle is effective because students are positively impacted by the novelty or newness of multiple beginnings and endings, and their attention span is shorter in the middle of instruction (Fitzgerald, 1996). A second research focus upon which teachers should be maximizing is what is known as the “Pulsed Learning” theory. This theory maintains that the brain tends to learn most effectively in a pulsed sequence. Students should be exposed to a focused activity
followed by a more diffuse or less concentrated activity—the idea being to cycle between focused or concentrated activities and more diffuse or relaxing activities as a natural pattern for the brain (Fitzgerald, 1996). For example, a 15-minute lecture followed by five minutes of discussion.

On a “best practices” level, knowledge claims from past research insist that larger blocks of time should allow for a more flexible and productive classroom environment (Irmscher, 1996) as well as greater professional collaboration (Gable & Manning, 1997). In addition, longer blocks of time allow the teacher to assume the role of facilitator as opposed to lecturer. This allows flexibility for use in instructional methodology (Salvaterra & Adams, 1996). Finally, time, space, and materials can be used more efficiently, allowing for maximal instructional time (Deuel, 1999).

Rationale for This Study

Several researchers report a need for more block scheduling studies. There have been very few large-scale studies of block scheduling, and, moreover, much of the research reported is based upon individual school evaluation reports (Canady & Rettig, 1999). It is difficult to conduct large-scale research on the academic results of block scheduling due to different models of teaching, the simultaneous implementation of myriad policies, and varying degrees of teachers’ faithfulness to implementation (Jenkins, Queen, & Algozzine, 2001). Nonetheless, several gaps in the knowledge base are open to examination.
Specific areas in need of further exploration include (1) changes that teachers have made in their instruction and interaction with students, (2) the impact of block scheduling on core academic subjects (Nichols, 2000), (3) the role of teacher preparation and staff development (Gruber & Onwuegbuzie, 2001), (4) the type of teaching or the change in teaching methods used in the block classes or schedules (Veal, 1999), (5) a study of teachers’ perceptions of the effectiveness of the block schedule after extended use, (6) factors crucial in making a smooth transition from a regular schedule to the block, and (7) advantages and measurable outcomes of block scheduling (Wilson & Stokes, 2000).

Up to the turn of the century, the majority of research has focused on student outcomes and achievement (Veal, 1999). Almost all research concerning the block schedule has either taken the form of open-ended qualitative surveys and questionnaires or focused on the correlational relationship between block scheduling and achievement (Spellman & Oliver, 2001). Yet there is a deficiency of studies exploring teacher attitudes towards block scheduling and how these attitudes impact its effectiveness as an educational restructuring tool (Corely, 2001). Further study is also needed to understand how to influence teachers to modify their instructional practices under the block schedule, as well as to understand the socio-political impacts of schedule change (Ross & Westerlund, 2001). There has been little research to discern whether teachers on the block schedule have adopted more instructional strategies in the classrooms than have
their peers in traditional schools (Jenkins, Queen, & Algozzine, 2002). Some individuals have recommended that more qualitative research be conducted in regards to block scheduling—particularly case studies, ethnographies, or grounded theory research—in order to examine reasons for variation in prior research results (Lewis et al., 2003). Furthermore, very little mixed-methods research exists in regard to the science classroom teacher experience on the block schedule.

The purpose of this study is threefold. First, this research addresses gaps in the professional literature related to differences in science teachers’ perceptions, attitudes, and instructional methods based on science courses taught (End-of-Course tested vs. Non-End-of-Course tested). Second, this study focuses on experience level and teaching on the block in terms of instructional methods used. Third, this study examines current concerns and needs teachers have experienced since changing to the block schedule. This examination is significant and timely in light of the fact that few studies have addressed teacher issues over a significant period of time (four years, in the case of this study) after switching to a block schedule. The results of this research may be beneficial to administrators and policymakers who are interested in teacher working conditions as well as teacher recruitment and retention. Through a sequential, mixed-methods approach, the following research questions were investigated using a test for significance:
1. Is there a difference in science teaching methods used between End-of-Course and Non-End-of-Course teachers with the block schedule?

2. Is there a difference in science teaching methods with respect to teacher experience level (number of years teaching) with the block schedule?

Data Analysis through a phenomenological procedure was used to discover insights, suggest relationships, and highlight challenges of teaching on the block schedule. Research questions addressed through qualitative survey questions and focus group interviews include the following:

3. Had science teachers’ instructional methods changed since the implementation of the block schedule?

4. What were science teachers’ current perceptions, attitudes, and feelings about the block schedule as it relates to instruction, school climate, and time/materials management?

5. What were science teachers’ perceived benefits and losses in changing to the block schedule?

6. What were the perceived current needs of science teachers to successfully continue the block schedule?

7. How had science teachers’ experiences changed over the past four years with the implementation of the block schedule?
Delimitations and Assumptions

This study is delimited in several aspects including time, location, and the sample selected. This research took place during the 2006-2007 school year. At the time of the study, Wake County had 20 high schools. While no school was exempt from survey administration, some schools were not selected for focus group interviews based on their schedule type (one school remained on the traditional schedule) or magnet/special program (small student populations or an alternative school). Some newer schools were not selected for interviews based on their not having experienced all grade levels at the time of the study. The school at which the researcher served as Science Department Chair was also exempt. Instead, it was used as a pilot study for the survey and focus group interview.

The research base cited several assumptions for science teachers: (1) the block schedule is easier for science teachers because they are already prepared for extended classes (Dow & George, 1998), (2) the relationships among science teaching practice and student achievement are notably complex because they involve several factors beyond block scheduling (Veal, 1999), and (3) the block schedule is ideal for science because of labs and projects that need a longer time frame (Veal, 2001). For all teachers, the assumption driving the change from traditional to block scheduling is that a structural change will cause teachers to teach differently and students to learn differently, leading to an increase in student
achievement. Finally, there is the belief that all teachers have the capacity to change (Shortt & Thayer, 1999).

**Organization of the Remaining Chapters**

Chapter 2, the Literature Review section, begins with a history of the block schedule as it developed in the United States and in North Carolina. Additional sections in Chapter 2 include a summary of past research on teacher perceptions, followed by a section on the benefits and drawbacks of block scheduling for teachers in the field. Chapter 3, the Methods section, describes the procedures and analysis used. Chapters 4 displays the results of the study, while Chapter 5 summarizes these results through discussion and implications.
CHAPTER 2 – LITERATURE REVIEW

History of Block Scheduling

One hundred years ago schools were very different learning environments from those of today—for students preparing for a life working in factories or farms as well as for the small percentage who went on to pursue college. In order to standardize learning across the country, the Carnegie Unit was created in 1909 by the College Entrance Exam Board in an effort to eliminate inconsistencies among institutions. The Carnegie Unit mandated a total of 120 hours of classroom instruction to be delivered in 40- to 60-minute classes (Hackmann, 2004). The Carnegie Unit awarded credits for graduation not by measuring mastery over subject matter, but by counting time spent in class (Flemming, Olenn, Schoenstein, & Eineder, 1997). However, educators today recognize the fact that “one size does not fit all” and that some students require more time to learn. In high schools across the country, reliance on the Carnegie Unit has made students prisoners of time (Lewis, 1999). This traditional high school structure remained essentially the same for most of the twentieth century, due in large part to traditions embedded in the American high school experience. However, some experimentation with flexible scheduling did occur in the late 1960s and early 1970s. Block scheduling had been widely used in British Columbia, Ontario, and Alberta since the 1970s (Kramer, 1996) and the United States eventually looked towards this model.
In particular, J. Lloyd Trump of the Oregon Department of Education urged the school schedule to be re-examined, and considered longer class periods as a way of improving instruction through Flexible Modular Scheduling (Kienholz et al., 2003). This Trump Plan allowed for a class to meet for a 40-minute lecture, a 100-minute lab, and a 20-minute help session each week. Other classes could be short periods of 20 or 30 minutes. Trump encouraged teachers using his design to experiment with a variety of instructional strategies and team teaching (Fletcher, 1997). Another pioneer in the flexible scheduling model was Joseph Carroll. Carroll reported that students did better in summer school than they had all year long due to the longer blocks of time students spent in class and the method of teaching used in summer school (Thomas, 2001). In the 1960s, an estimated 15% of America high schools implemented this type of scheduling. Yet schools frequently abandoned modular scheduling strategies because they often focused on making changes in specific subjects rather than providing benefits across the entire school curriculum (Pettus & Blosser, 2001). Other reasons schools failed to maintain flexible scheduling were that it included too much independent study time, school management became a problem, and teachers in many schools never were assisted in changing classroom instruction for the longer periods of time (Pettus & Blosser, 2001).

Subsequently, by the 1980s the school schedule came under serious scrutiny due to a number of factors: (1) The Carnegie Units required to graduate
were increased to 24, which meant little room for electives in performing arts and vocational classes; (2) Adding periods to the class day meant 38-minute class periods (30 to 35 periods a week); (3) The use of technology in schools increased; and (4) Having thousands of students in the hallways several times a day created school management problems (Canady & Rettig, 1999). In addition, in 1983, *A Nation at Risk* was published by the National Commission on Excellence in Education. This report stated that American students were academically lagging behind a number of other industrialized countries. Compared to other nations, American students spent much less time on school work; time spent in the classroom and on homework was used ineffectively and schools were not helping students develop the study skills required to use time well (National Commission on Excellence in Education, 1983).

By the late 1980s a focus had emerged on restructuring for more effective use of school time and increased concentration on core academic subjects (Evans, Tokarczyk, Rice, & McCray, 2002). Critics began challenging the daily-period models, arguing that this reinforced the use of lecturing, contributed to fragmentation of the instructional day, discouraged in-depth exploration, and inhibited curriculum integration (Hackmann, 2004). In the late 1980s block scheduling became more widespread throughout secondary schools in the United States (Lewis et al., 2003). One such block model that developed was the Copernican Plan, proposed by Joseph Carroll in 1987. According to Carroll, this
plan was a better way to re-organize high schools based on research and experience of efficient instruction.

In Carroll’s plan, students enrolled in one class at a time for about four hours each day for a period of 30 days (Carroll, 1987). He claimed that, according to his study with eight high schools using the block format, there were a number of benefits. For instance, there was (1) more time for continuity so that teachers could develop their teaching approaches, (2) more time for extended lunch or practice sessions, (3) fewer subjects for students to concentrate on at any one time, and (4) potential for better monitoring of student progress due to a reduced number of students for each teacher to work with (Carroll, 1994). His findings also included (5) improved student attendance, (6) a decrease in suspensions, (7) reductions in dropout rates, (8) greater content mastery reflected in higher grades and credits earned, and finally (9) a favorable rating for the Copernican Plan compared to the traditional schedule (Carroll, 1994).

Parallel to this research, the National Education Commission on Time and Learning published *Prisoners of Time* in 1994. The report emphasized that schools should focus on the learning that occurs in schools as opposed to the time spent in schools:

Learning in America is a prisoner of time. For the past 150 years, American public schools have held time constant and let learning vary. The rule only rarely voiced is simple: learn what you can in the time that is available…Time is learning’s warden. (National Education Commission on Time and Learning, 1994)
Flexible instructional time, which can be provided by scheduling larger blocks of time, was argued to be able to accommodate this need (Harmston et al., 2003). The following year, *Breaking Ranks*, a book published by the National Association of Secondary Principals (NASSP), recommended restructuring time and space to provide a more flexible secondary schedule (Kienholz et al., 2003). In the twenty-first century, the most pervasive document supporting block scheduling is George W. Bush’s *No Child Left Behind* decree, which envisions efficient use of time as an avenue for improving learning (Metzker, 2003).

**Relevant Studies on Teacher Perceptions of Block Scheduling**

Support for claims regarding benefits of block scheduling for teachers can be found in a number of studies. For instance, through a survey at Midwest high school, 60% of teachers stated that they had experimented with new instructional approaches and begun using a greater variety of classroom activities (Creamean & Horvath, 2000). In another example, a quasi-experimental, comparison group research study compared the block versus the traditional schedule. Ten teachers were surveyed, followed by focus group interviews and observations. In the block schedule design, results showed that teachers could address the needs of more students, and teachers cut out “busy work.” While no consistent pattern emerged in teacher methods, block scheduled classes were smaller and teachers perceived that students used better study habits, that they were engaged more and interested in class activities, and that they learned more and received more
personal attention (Knight et al., 1999). This affirms Lare et al.’s study (2002) in which teachers felt that they could get to know students better by helping students during planning, in addition to having more preparation time for classes. When teachers were able to build student rapport, they could easily identify their learning styles and incorporate these into instruction, leading to better class performance. The researchers adopted a case-study approach in a Pennsylvania school involving a staff of 100, using 20 Likert-type items on topics ranging from teaching strategies to perceptions on block schedule, as well as four open-ended items centered on improvements needed in current schedule. They also utilized focus groups, interviews, class observations, and archival records for students. The major finding was teachers reported a decrease in stress.

In another survey in a large urban district in Broward County, Florida, 93% of teachers stated that they implemented a variety of new teaching techniques, 86% reported having increased the number of learning activities, 84% claimed to have experimented with different student evaluation techniques, and 65% stated that they provided more individualized attention. In addition, 65% of teachers agreed that the instructional units were less fragmented, over 67% reported feeling better about coming to school, and 57% percent felt that the school climate had improved (Deuel, 1999). Furthermore, a rural public secondary school in the South with a large poverty level underwent a case study design using archival data, questionnaire data, observations, and interviews with
four teachers. The survey questions focused on school climate, academics, and time/materials management. The results indicated that 93% of teachers believed reducing the number of classes per day increased productivity, 83% perceived stress reduction as a beneficial outcome, 72% believed there were fewer discipline problems, and 63% believed that improved relationships had ensued. Teachers unanimously reported experimenting more with instructional strategies, requiring fewer preparations, and having more planning time. Finally, teachers cited fewer students in their classes and more classroom time for activities, and teachers overall felt more empowerment in their instructional role through planning. However, teachers did express a need for adequate materials, equipment, and supplies, and continued in-servicing (McCoy, 1998).

**Role of Professional Development and Pedagogical Expectations**

The role of professional development appears to be an important component in creating success on the block schedule. The common theme to the most successful schools seems to be professional development in the areas of instructional methods and pacing before, during, and after implementation. For instance, as a counter-example, through interviews and observations in Advanced Placement (AP) Mathematics, one researcher noted in a Texas magnet school that the in-service provided—a single staff day—was inadequate to help restructure courses. This one-shot approach, combined with the loss in instructional time throughout the year, led to the AP program’s demise (Howard, 1998).
study by Lare et al. (2002), little to no instruction was provided to new teachers, and 42% indicated dissatisfaction with the block schedule for the ones who were trained.

In another instance, researchers conducted interviews with four to six teachers in 12 high schools. The difference in pedagogical expectations for teachers under the new block schedule, along with their inability to foresee the impact of the schedule change on student achievement, presented uncomfortable and intolerable stressful situations, even before the change was actually implemented. The main conclusion from this research was to understand that changing to the block schedule is an ongoing process, not a single event. With the change from traditional to block scheduling, teachers were being asked not only to restructure their lessons for longer blocks of time, but also to change from a pattern of assigning readings, giving homework, and lecturing to collaborative learning and project-oriented activities, which are more student-centered (Salvaterra & Adams, 1998).

Moreover, some unfortunate cases come from the expectations block scheduling is predicted to provide and the reduction in time with which to emphasize depth over breadth. For instance, in an Alabama study involving Benjamin Russell High School after it moved to the block schedule in the mid-1990s, teachers reported difficulty planning for extended periods and proceeding too slowly with the curriculum, leaving them short on time by mid-semester
(Spencer & Lowe, 1994). In another example, teachers at South Springfield High School in the Midwest participated in quantitative surveys, qualitative interviews, and observations, in addition to turning in lesson plans. Instructional methods for most of the teachers with block classes changed by adding variation in methods. However, teachers experienced increased levels of anxiety due to the increase in the pace of teaching and the difficulty of deciding how to eliminate course content. Teachers stated that because of the time reduction, and the subsequent pressure to cover necessary curriculum, the block schedule negated personal relationships. Teachers also mentioned dissatisfaction with time to reflect, and that they had resorted to an increase in lectures and handouts as a quick way to cover the material. In this case the loss of time was a limitation for instruction, and consequently teachers regressed back to traditional methods due to time constraints. This change was also guided by the state core curriculum. Almost as if they were at a loss for what to do, teachers also fell back on their textbooks to guide them. They reported feeling like first-year teachers, and claimed they needed more time and resources before, during, and after reform initiatives to best prepare for implementation (Veal, 2001).

**Mixed Block Schedule Results**

Some studies have shown mixed results regarding the block schedule. In a study by Bottage, Gugerty, Serlin, & Moon (2003), for example, 24 out of 379 schools in a state in the upper Midwest were surveyed using a stratified random
sample based on the size of the school. Teachers were questioned as to the amount of time they spent in various instructional activities, their satisfaction with their school schedule, their confidence in teaching students with disabilities, and the extent to which they collaborated with one another. The results of this study indicated that teachers devoted more time to working with students in small groups and individual students than lecturing. Yet no significant differences in the levels of collaboration between block- and traditionally-scheduled teachers were revealed, and block-scheduled teachers assigned a significantly higher level of value to collaborating. The researchers concluded that moving from a more traditional schedule to a block schedule does not necessarily lead to instructional modifications or academic benefits (Bottage et al., 2003). That is, a different schedule does not necessarily mean teachers will change their methods.

The above case is not isolated. At Cleveland High School in Mississippi, teachers were the focus of a study in respect to how they felt block scheduling related to student learning and behavior. Using surveys and observations, researchers noted that more teachers focused most on lectures, followed by seatwork as the next popular instructional method. They employed more traditional strategies and applied more textbook-driven lesson planning, and consequently, students often caused behavior problems due to slow pacing. Subsequently, teachers displayed poor classroom management on the block and requested more training in instructional innovations (Griffin, 2001). This study
supports one in Millard High School in Utah, involving 90 teacher surveys followed by focus groups. Major findings of this study indicated that 74% of the teachers allowed homework to be done in class, yet 65% felt that more content could be taught in class. Also, 35% of the teachers agreed that they needed more training, and suggested that students were not willing to step up to the plate academically and allow themselves to be taught and prepared (Tan, Callahan, Hatch, Jordan, Eastmond, & Jordan, 2002). Perhaps more relevant to this dissertation study, the North Carolina Department of Public Instruction conducted a 1997 analysis through use of a survey. Twenty-five high schools reported that the instructional methods used were mostly traditional (lectures, students working at desks, small group work, and assessment by traditional paper/pencil tests). This survey revealed that pacing, alignment, and planning content-specific units were the most essential professional development needs of the teachers (NCDPI, 1997). Still narrowing the focus, in Wake County an initial study of block scheduling was conducted in 2004, after the first year of implementation. This study reported that over 90% of teachers had received some training on implementing the block schedule with major emphasis on diverse instructional strategies. Other findings showed that 65% of the staff agreed that the change to block schedule had been positive and that 58% of teachers agreed that the pacing guides they received were helpful. Still, the most popular methods reported were discussion (favored by 63%) and lecturing (55%). In the first year of conversion,
teacher opinions varied on whether the block schedule allowed them to improve instruction and relationships with students. Fifty-six percent of teachers said the block schedule allowed the use of more diverse teaching methods and 50% said the block schedule allowed them to cover concepts in as great a depth as in the traditional schedule, but 64% felt that discipline in their classrooms had not improved (Reichstetter & Baenan, 2005). The report acknowledges that the major issues and challenges continue to be (1) the faster pace, (2) that more time is needed for planning, (3) teachers’ need for greater breaks in instruction coupled with more instructional methods, and (4) difficulties created in the teacher-student interrelationship created by time constraints (Reichstetter & Baenan, 2005).

However, while teachers agree that more professional development is needed, there is disagreement as to when professional development should take place. Teachers are exhausted at the end of the day, and in recent years North Carolina teacher workdays were cut from 20 to 15. While some schools employ professional development during teachers’ planning periods, this can lead to setbacks. In one particular case, teachers in 21 schools in Louisiana were studied in regard to perceptions of school climate using individual and focus group interviews. The questions centered on school leadership, student discipline, faculty collegiality, staff development, and attitudes toward block scheduling, in conjunction with a survey. Reported results were that too much time was taken for staff development at the expense of planning. Teachers recognized that they
needed professional development, yet they felt pressured to cover a great deal of material in one semester. They faced additional problems such as staying organized and maintaining good time management, and some complained that teachers with low expectations showed movies. One major conclusion in this mix suggested that a principal’s leadership, ability, and commitment mattered more than the scheduling pattern (McCoy & Taylor, 2000).

The most recent study conducted in Wake County, North Carolina in regard to science teacher practice centered on effective Biology teaching. The highest End-of-Course scoring teachers indicated that they (1) used lab and lecture on the block schedule, (2) controlled student time and attention, (3) used data, and (4) collaborated with one another. Thus, there is a recognized need to explore ways to help teachers find this time to study their data, plan together, and engage in discussions, identifying the best teaching strategies on the block (Haynie, 2006). Perhaps the advent of the early-release days in the Wake County schools’ 2008-09 calendar will satisfy some of these teacher concerns.

There are also other barriers to success on the block schedule. In western North Carolina, teacher interviews revealed that because there was too little time to cover the required material, there was no time for enrichment. This is ironic because as a result of stress induced by attempting to cover the required material, teachers eliminated non-essential enrichment activities, which are advantages cited by block scheduling advocates. However, teachers believed the advantages
outweighed the disadvantages of losing those seven to 15 instructional hours each semester, and of working within a schedule designed to foster depth rather than breadth (Hurley, 1997).

**Gender and Subject Area Differences With Block Scheduling**

Some researchers have suggested that block schedule success may depend on teacher gender and subject area differences. In a Missouri study, for example, the effects of block scheduling on student achievement, school climate, and teacher methodology were studied using 152 teacher surveys. The majority of teachers believed that block scheduling had improved student achievement. Furthermore, educators believed that there was an improvement in the quality of student work, depth of subject matter covered, and student retention, and increased enrollment in advanced courses; however, math and science teachers did not agree with this assessment. These teachers did not perceive an increase in A/B grades. In addition, teachers with five or more years of experience noted an increase in curricular scope, while teacher with four or fewer years of experience with block scheduling noticed a decrease in curricular scope. Yet teachers overall reported that the school day was less hectic, that there was a positive impact on student-teacher relationships, and that there were reduced discipline referrals and reduced teacher stress. The major conclusion of this study was that block scheduling served as a catalyst to improve school climate, and improved student achievement in at least some academic disciplines (Stader & DeSpain, 1999).
In another case, a Huntington Beach study examined four blocked schools on the basis of several factors: (1) instructional practices, (2) assessment techniques, (3) social interaction, (4) curriculum, (5) school management, and (6) how restructuring time in the instructional day affected teacher behaviors in the classroom. Researchers concluded that block scheduling facilitated the use of a variety of instructional practices, that teachers were better able to assess the individual needs of students, and that the schedule encouraged teachers to attempt new assessment methods. In addition, the schedule seemed to facilitate personalization. Material was covered in greater detail but fewer units were covered, and teachers reported that they were more relaxed, as were their students. However, teachers with five years under block scheduling differed significantly from teachers with two and three years of experience. Those teachers with five years of experience expressed greater satisfaction with 38 out of 50 items on the survey (Staunton, 1997).

Another difference was noted in a study involving four high schools in northeastern Pennsylvania. Surveys completed by 129 teachers investigated teacher perceptions in regard to instructional behavior, new instructional activities utilized, cooperative learning strategies, and changes in teacher preparation time. After one year, the majority of teachers stated that block scheduling enhanced their ability to include new activities in the classroom and led to an increase in cooperative learning. However, female teachers with greater experience and male
teachers with less experience perceived that they altered their student assessment strategies more so than did male teachers with greater experience, and that they had increased their use of library materials and services (Salveterra & Adams, 1996). Moreover, in Stader & DeSpain’s study (1999), teachers with five or more years of experience with block scheduling indicated a significant decrease in teacher stress while teachers with less experience indicated a slight increase or no change. Similarly, teachers with five or more years of experience with block scheduling found the school day much less hectic than did their colleagues who had less experience with block scheduling (Stader & DeSpain, 1999). Another finding was that male teachers reported spending significantly less time than female teachers did preparing for classes. Specifically, 30% of the male teachers spent less than one hour per day in preparation, while only 15% percent of the female teachers spent less than one hour per day. Thirty-nine percent of the male teachers felt that student retention had increased, while 24% of the female teachers felt similarly (Fletcher, 1997).

However, not all relevant studies have revealed major teacher differences. For instance, a study by Wilson and Stokes (1999b) investigated the effectiveness of block scheduling as perceived by teachers. Researchers examined teacher perceptions of the factors critical in implementing block scheduling and maintaining it as an effective management tool. From the four schools selected (137 teachers), there was no significant difference in subject area taught or years
experience versus perceived block effectiveness. However, teachers did maintain that block scheduling was more effective than traditional scheduling due to more time on-task, and that the school atmosphere was more positive. Teachers felt they had improved attitudes towards their school, and again mentioned that adequate planning time along with relevant faculty training were essential when implementing block scheduling (Wilson & Stokes, 1999a). In conclusion, the majority of studies on block scheduling from a teacher’s perspective (especially science) would best be described as small-scale and limited with mixed results. This research study’s goal, therefore, is to add to the body of knowledge and to investigate issues related to science teachers’ experiences on the block schedule. As reflected by past studies, some schools demonstrate success with the block transition while others flounder through the change. In order to bridge the gap between theory and practice, the next section describes other considerations involved with this study in terms of benefits and drawbacks for educators teaching on a block schedule.

**Impacts on Teachers and Best Practices**

**Curriculum and Collaboration**

One of the main benefits of rearranging the school schedule into 90-minute increments is that integration can occur more easily. Block scheduling provides opportunities for cross-team networking for academic departments, interdisciplinary teams, and student teaming (Shortt & Thayer, 1999). In
addition, teachers report re-examining their curriculum with this restructuring in terms of specific lessons and activities as they decide what is not important in order to meet their objectives (Veal, 2001). However, when teachers are inexperienced with planning for the longer periods during their teacher training, they can find it difficult without support. The first year on block scheduling is the most challenging for teachers and principals because block scheduling requires teachers to prepare lessons that engage students during longer periods of instructional time (Queen, 2003). In addition, time is precious to teachers in block scheduling, since they feel that they have less time and fewer days to accomplish their tasks (Averett, 1994). For instance, it is not uncommon for teachers who have taught for years to get more than halfway through the semester or year and discover that they have covered less than half of the content intended (Pettus & Blosser, 2001; Lowe, 1994). With the decrease in instructional hours, there is also a need to re-think homework in terms of quality rather than quantity (Shortt & Thayer, 1999). Consequently, teachers must make hard choices about essential content. Yet teachers in all subject areas reported that it is difficult to eliminate this course content, and their reluctance to eliminate content is rooted in their conceptions of teaching and what it means to be a teacher. According to this study, the most likely candidates for selective abandonment included the chapters at the end of the text, content that does not appear on the state proficiency guidelines or exams, and information students will not need for other courses.
(Veal, 2001). Depending on the schedule type, some teachers report added difficulty in preparing students for standardized tests because some students may take the course in the fall and the standardized test in the spring (Hayley, 1997).

**Efficiency**

At its best, block scheduling can be very efficient. A teacher can complete whole tasks within the framework of a single period, since block schedules are naturally designed to reduce the fragmentation inherent in single-period schedules (Pettus & Blosser, 2001). Within this 90-minute period, there is time for review, teaching, and student practice. For science teachers in particular, there is time for the pre-lab, lab, post-lab, and even clean-up. Having 90 minutes requires less time lost on routines, procedures, and management. For instance, the total time lost for routine administrative tasks such as taking class attendance can be reduced by as much as 50% (Queen, 2003). For teachers, it is easier to manage less student paperwork and parent communication per semester compared to the traditional schedule. From a traditional schedule, teachers’ classes per day decrease by two, and the number of students per day decreases by almost half, from an average of 116 to 67 students (NCDPI, 1997). Depending on the schedule type, it can also be a more efficient use of textbooks. For some teachers the total time lost is negligible, and some report that coverage of course content is not greatly reduced because there are fewer transitions throughout the day (Queen, 2003).
On the other hand, some teachers complain that longer class periods do not compensate for fewer days in class for students in mathematics and science when they must reduce the number of concepts covered in class (Howard, 1998). Math classes in particular may be affected. For example, because of the sequential nature of the subject, math classes may need to be overhauled to fit the block schedule, for example, by creating an Algebra III class (Gullatt, 2006). Depending on the schedule type, many teachers have also found themselves unprepared for the increase in paperwork that can arise in a block schedule (Robbins et al., 2000). In one case, approximately 40% of teachers felt that paperwork had increased (Fletcher, 1997). Also, because of the new demands, it may take its toll on teacher health. For instance, one school principal reported that teacher absenteeism was higher than usual on the block schedule (McCoy & Taylor, 2000).

**Student Relationships and Classroom Climate**

One goal for Wake County schools is to increase personalization for students, and block scheduling is believed to be the catalyst to drive this change (WCPSS, 2005). Block schedules are designed to reduce the number of students teachers must prepare for and interact with each day (Calvery, Sheets, & Bell, 1999; Hayley 1997; Northeast and Islands Regional Educational Lab, 1998; Pettus & Blosser, 2001; Queen, 2003; Stader & DeSpain, 1999). Consequently, teachers can develop rapport with their students, thus reducing discipline
problems. Because teachers have fewer students, they are better able to get to know their students’ unique learning styles and adapt lessons to fit individual needs. In addition, more time with students means more time for discourse, to assess prior knowledge, and to identify misconceptions.

For special population students, better services may be provided by teachers. For instance, benefits for special education teachers include support for teachers’ ability to monitor and assess student progress during learning while students are in general education classes, to observe students with learning needs in authentic settings, and to accurately assess students’ need for specific learning-strategy instruction and content remediation (Eisenberger, Bertrando, & Conti-De’antonio, 2000; Weller & McLeskey, 2000). In addition, because there is a decrease in transitions due to the four-period day, some teachers reported seeing fewer discipline problems and disruptions outside their classroom (Staunton, 1997). Finally, for some teachers, block scheduling can create professional renewal among teacher and administrative staff (Shortt & Thayer, 1999).

Conversely, however, discipline problems can be intensified at times if this 90-minute period is not used effectively. For instance, some teachers have difficulty motivating students and keeping their attention for an extended period of time (Queen, 2003). This can be especially difficult for first-year teachers, who frequently have problems with classroom management. In one study of first-year teachers, one teacher felt a loss of control over the class when she tried any
method in which students left their seats (Zepeda & Mayers, 2001). Student-teacher relationships can also be threatened because of the pressure to teach the necessary curriculum (Veal, 2001). Other issues include the magnification of student absences, students having to keep up with books and due dates, and the difficulty some students have in paying attention for the duration of the longer period (Weller & McLesky, 2000).

Planning

Undeniably, the most beneficial facet of block scheduling is the increase in daily planning from 45- to 90-minute periods of time. In fact, the desire for this extended preparation period has been a major motivation on the part of teachers to adopt block scheduling (Averett, 1994; Canady & Rettig, 1995; Wilson & Stokes, 1999a). However, this increase in planning time is preceded by higher expectations. For example, in one case, there was a clear agreement among teachers and administrators that lesson planning was more difficult in block scheduling, but teachers and administrators believed that teachers had greater opportunity to help individual students, use collaborative or cooperative learning strategies, and improve student critical thinking skills (Stader & DeSpain, 1999). Hence, teachers are not expected to maintain traditional teaching methods, but instead utilize more student-centered approaches.

Yet at times these longer planning periods must be protected. One study reported that too much time was taken for staff development at the expense of
instructional planning; team meetings and staff development demands compromised teachers’ available planning time (McCoy & Taylor, 2000). This is especially important for first-year teachers. It is often more difficult for the beginning teacher to adjust to the larger block of time than it is for the experienced teacher because of limited resources and years experience. Moreover, the most difficult aspects of a lesson plan for high school teachers seem to be the development of appropriate activities for the application phase of a lesson and the management of pacing and transitions. Initially, teachers report feeling greater stress until they learn how to plan for and teach in an extended block of time; but eventually, both teachers and students report that school becomes less stressful (Rettig & Canady, 1999). It is interesting to note that some block teachers acknowledge less time to reflect on their work than traditional teachers; one block science teacher wrote, “I have no time for anything except keeping up and getting ready for tomorrow” (Veal, 2001). As a result, teachers may spend an excessive amount of time recognizing and adjusting to the rhythm of the school schedule the first year of block scheduled classes, rather than addressing the needs of learners in their classrooms (Schultz, 2000).

**Instructional Methods**

Still, one of the strongest advantages of moving to the block schedule is the opportunity to vary instructional strategies. For example, in block classes, teachers can increase the number of activities that require an exploration of in-
depth topics, such as working in a lab or problem-solving environment, pursuing an integrated approach to learning, working across disciplines, completing joint assignments from team teachers, or working in student teams (Shortt & Thayer, 1997). School media centers are also used for student research more with the block schedule (Huffman, 2005). In a block-scheduled environment, teachers can become facilitators rather than directors of learning. In addition, technology can be used effectively to vary the formats of the instructional activities, thereby enhancing student learning and motivation in science (Pettus & Blosser, 2001).

For instance, in one action research study, Web-Assisted Instruction was used to enhance students’ learning physics in the block schedule (Persin, 2002). Block scheduling can also provide more daily class time for teachers to implement the inquiry approach. The block classes provide great class-session formats for science teachers who wish to use inquiry-based student investigations and experiments as the basis for their instruction (Pettus & Blosser, 2001). Ironically, however, some science teachers acknowledged that while there is more time in the day for labs, there is less time in the course for that purpose because of the amount of content expected to be taught (Averett, 1994). Effective instructional strategies for block scheduling are listed by a number of researchers shown in Table 2.1.
**Block Plans Compared and Unique Teacher Issues**

While there is no single perfect schedule, there are advantages and disadvantages of the 4X4 or A/B block plans. This is relevant because in Wake County, both plans exist in the high schools. Depending on the school’s plan, teachers may encounter certain constraints that affect their practice. In the 4X4 plan for example, teachers work with fewer students at a time than the A/B model, they may have fewer preparations, students may retake failed courses the next semester, and fewer textbooks are required (Northeast and Islands Regional Educational Lab, 1998). In the 4X4 plan, there is also greater continuity of lessons, and itinerant teacher schedules can be simplified (Canady & Rettig, 1995). Teachers using this model obtain a new set of students for the second semester and therefore have more opportunities to refine lessons. Consequently, first-year teachers also have the opportunity to have two “first days of school” with which to practice. However, two main problems with the 4X4 schedule include sequential courses and student retention. For example, a student may complete a ninth-grade science course in the fall of his or her freshmen year, then not take another science course until the spring of his or her sophomore year. Sequencing also becomes problematic for teachers in cases where the math prerequisite is scheduled for the following semester. The 4X4 plan is also a catch-22 for AP teachers. Unlike End-of-Course tests, which are taken at the end of each semester, the AP exams are regulated by the College Board, and exams
are administered in May. As a result of the North Carolina calendar, there are more instructional days in the fall semester, but students risk retention issues if the course is not taken in the spring. Teachers have appealed to the College Board for two exams each year, but the request was denied because relatively few students are affected (Rice, Croninger, & Roelke, 2002). In contrast, the A/B plan meets every other day and thus spreads the teachers’ course load over the entire year. Distributing the coursework over the year allows students more processing time, but at the expense of daily continuity. However, schools that choose this plan have more options with which to designate one block period to a magnet program, an assembly, advisory, club meeting, intramurals, tutoring, test-taking, departmental meeting, and/or seminar. With recent NC Department of Public Instruction initiatives such as Freshmen Academy and Senior Projects, this schedule might be more advantageous, yet only one high school in Wake County utilizes this block plan. Additional advantages for teachers include (if teaching the same preparation on both A and B days) having the same lesson plan for two days, less dependence on a pacing guide, and fewer concerns with the AP program compared to the 4X4 plan since the course meets all year. However, some instructional difficulties include providing balanced teacher workloads; satisfying requirements that if a student is failing a course he or she typically must remain in the course for an entire year; teachers having to work with 100-180 students during the year; teachers being responsible for as many as six different
preparations; and record-keeping for 100-180 students throughout the year (Canady & Rettig, 1995).

This chapter synthesized the literature review and the major research studies completed to date. The third chapter, Research Methods, describes the logistics of the study in terms of its design, population, sample, instruments, data collection, data analysis, and limitations.
Table 2.1

**Effective instructional strategies for block scheduling**

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<tr>
<th>Author(s)</th>
<th>Instructional Strategies</th>
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<tr>
<td>Canady &amp; Rettig (1996)</td>
<td>- Concept Attainment</td>
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CHAPTER 3 – METHODOLOGY

Research Design

Mixed-methods designs can benefit studies because they bring greater understanding and insight to answering the research questions. Using only quantitative or qualitative research also presents certain limitations; this study incorporated a mixed-methods approach in order to counter-balance those weaknesses. Specifically, the type of research design used was a cross-sectional, sequential, quantitative anonymous survey followed by eight qualitative, stratified purposeful focus group interviews to help explain survey data, as modeled in Creswell (2003). The rationale for this selection was that all science teachers in Wake County had an equal opportunity to participate in the survey, and the data was generated quickly and easily. After initial analysis of the surveys, focus group questions were generated. The interviews were stratified based on location and were purposeful in seeking out schools with a range of teacher experience. These subgroups helped to facilitate comparisons using qualitative analysis.

Focus groups were chosen because they have many benefits, and they were practical given the time constraints on teachers. For instance, Vaughn, Schumm, & Sinagub (1996) pointed out that using small groups of participants could be orderly and controllable if moderated correctly. Data could be rich and generated fairly quickly, with little preparation time needed on the part of the researcher. In addition, they offered several advantages including (1) seeing the
experience from participants’ points of view, (2) discovering interconnections, (3) stimulating discussions to uncover concerns and opinions, and (4) examining barriers and conflicts. Because survey data alone could identify a problem but not necessarily elaborate on it, the focus group data allowed researchers to understand the issue at a greater depth, as group members dynamically interacted through normal candid conversation (Vaughn et al., 1996). Also through focus groups, the interviewer could ask questions to obtain a variety of opinions while probing teachers’ emotional reactions, perceptions, and experiences. Unanticipated but relevant concerns could be uncovered because of the range of courses taught, specificity of the topic, and personal contexts inherent in focus group interviews. Participants as key stakeholders were a valuable data source because their language was used to explain their encounters with block scheduling. Focus groups were chosen over small group interviews because the group interaction created synergy, a snowballing of ideas, stimulation, security, and spontaneity due to group members’ prior acquaintance with each other—as anticipated in Vaughn et al., (1996). In addition, teachers appeared to benefit from having their opinions verified by others as they voiced their needs, values, and perceptions, and seemed to gain insights by listening to others.

This study design was appropriate because teachers could complete the survey easily and with minimal demands on time. Focus groups were suitable because many science departments had 12 to 20 members. In some interviews, a
fewer individuals participated due to other demands on their time. As a teacher in Wake County, the emic (insider) perspective, as described in Fraenkel & Wallen (2009), helped with obtaining a high survey return (70%) as well as with the elicitation of focus group responses. The study design was also possible because it aligned with phenomenological analysis, as described in Chapter 4. Creswell (1998) described a phenomenological study as summarizing the collective lived experiences for several individuals around a phenomenon or concept. The results of this research both reflect how teachers experience the block schedule and draw meaning from those experiences.

Population and Access to Participants

The population represented all high school science teachers in Wake County, North Carolina who were teaching on the block schedule during the 2006-07 school year. Access to participants was first requested through North Carolina State University IRB (Appendix A) and then through Wake County Schools IRB (Appendix B). Once entry was granted at the county level, the Director of High School Programs was contacted through e-mail. He, in turn, sent an e-mail to the high school principals, notifying them that this study had filtered through the proper channels. From there, the participants were contacted through each school’s science chair. Later, at one of the monthly science chair meetings, the chairs received a folder with instructions regarding administering and collection of the surveys. In these folders, each department chair was given
directions (Appendix C), one survey (Appendix F), one raffle ticket (Appendix C), and a list of donated prizes from science companies for which letters were written (Appendices D and E). All but three chairs were at the February meeting. The remaining folders were U.S. mailed to those absent, and e-mails were sent as follow-up to ensure that the folders were received. Access to participants for the interviews was requested through a direct e-mail to the department chair. Once contacted, department chairs assisted with the logistics, and participants completed the interview consent form (Appendix G). A coercive situation was avoided because of the fact that chairs are not evaluators in Wake County, and thus had no bearing on teacher evaluations. The science chairs were instrumental both in survey administration and through focus group cooperation.

**Instrumentation and Data Collection Procedures**

Prior to data collection, a pilot study was conducted at the researcher’s school. Participation was voluntary and participants received a free gift certificate for their time. In the survey, six participants responded to the questions, then were asked questions about the survey. All completed the survey within 15 minutes and stated that the questions were clear. In the interview portion, one unforeseeable problem occurred when an oversupply of beginning teachers, who had only known the block schedule for two years or less, became evident. Therefore, the sample selection in the interviews needed to include both beginning and experienced teachers in order to obtain a range of experiences.
As to the instruments themselves, a survey was selected because teachers are familiar with them, the questions were straightforward and teachers could respond to them in little time (Agresti & Finlay, 1997). Yellow paper was chosen so that it would not be easily lost or blend in with teachers’ other papers. The survey questions were Likert-type categorical, and a section was reserved for free response. The survey was designed after a comprehensive review of the literature on block scheduling. An already-validated survey was sought from experts in the field and from consulting with the North Carolina Department of Public Instruction, but no known instrument was in existence. Table 3.1 displays an alignment of questions and survey questions.

In the focus groups, the researcher was the data collection instrument. Just prior to conducting eight focus groups, the researcher volunteered to be a participant in a focus group on science textbook selection. Notes and observations were taken from this experience. A moderator guide was also developed after reading focus group literature (Appendix G), which helped to promote consistency between the eight focus groups. The focus groups were audio-taped using two tape recorders, and careful notes were taken during the interviews. Participants wore nametags and filled out their demographic information—such as years of teaching experience, subject taught—on an index card. Interviews lasted 60 to 90 minutes. At the end of each interview, the materials were placed in a folder and labeled with the school and date. For their
time, participants received a free meal and were entered into a drawing for science prizes. The audiotapes were transcribed as soon as reasonably possible, although no tapes were transcribed until all of the interviews were completed in order to avoid bias through asking leading interview questions. All eight interviews were conducted within two months time.

Table 3.1

Alignment of Research Questions and Variables versus Question Item on Survey

<table>
<thead>
<tr>
<th>Research Question and Variable</th>
<th>Question Item on Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teaching Methods of EOC and Non-EOC Teachers</td>
<td>Part A: Demographics (7)</td>
</tr>
<tr>
<td>2. Teaching Methods and Number of Years Experience</td>
<td>Part A: Demographics (1-5)</td>
</tr>
<tr>
<td>3. Change in Instructional Methods</td>
<td>Part C: Instructional Methods Used in the Block Schedule</td>
</tr>
<tr>
<td></td>
<td>Part D: Short Answer Opinions (5)</td>
</tr>
<tr>
<td>4. Perceptions, Attitudes, and Feelings About the Block Schedule</td>
<td>Part B: Teacher Opinions</td>
</tr>
<tr>
<td></td>
<td>Part D: Short Answer Opinions (6)</td>
</tr>
<tr>
<td>5. Benefits and Losses</td>
<td>Part B: Teacher Opinions</td>
</tr>
<tr>
<td></td>
<td>Part D: Short Answer Opinions (1, 2)</td>
</tr>
<tr>
<td>6. Current Teacher Needs</td>
<td>Part A: Demographics (6)</td>
</tr>
<tr>
<td></td>
<td>Part D: Short Answer Opinions (3, 7)</td>
</tr>
<tr>
<td>7. Change in Teacher Experience Since the Block Schedule</td>
<td>Part D: Short Answer Opinions (4, 8)</td>
</tr>
</tbody>
</table>


**Data Collection Timeline**

November 2006 – NC State IRB approval

December 2006 – Wake County Schools approval, preparation of survey folders

February 2007 – Administration of surveys to science chairs

March 2007 – Surveys due, initial survey analysis to generate interview questions

April-May 2007 – Conducted eight focus group interviews during workdays and/or after school at the participants’ school site

**Limitations**

Some possible threats to internal validity inherent in using surveys as instruments include the following: subject difference characteristics, mortality, location, instrument decay, data collector characteristics, and data collector bias (Fraenkel & Wallen, 2009). In addition, variables that may have influenced outcomes included gender differences, education levels, ethnicity, and certainly years of teaching experience (Vaughn et al., 1996). To help minimize these threats, data collection procedures were standardized. Surveys were administered at each school within the same month, and department chairs were asked to follow up and give absent participants a survey as well as to distribute the surveys at one of their monthly department meetings. Chairs were provided with a set of directions and asked to refrain from stating their own opinions about the survey to help minimize data collector bias. External validity (generalizability) could be
reasonably extended to the rest of the county, given the high rate of survey return (70%). The researcher expected this high rate of return due to the fact that the 2006-07 school year had three science End-of-Course tests being piloted. Teachers, comparatively, were not under as much stress and may have had more time to complete these surveys. However, it is not likely generalizable to the state of North Carolina, given that Wake County is very unique among that state’s counties.

In the focus groups, trustworthiness of the data was ensured through a prolonged period in the field, asking interviewees to provide background information, taking detailed notes during the interviews, checking member responses through questioning, offering anonymity, and triangulation of the data (Creswell, 2003; Hatch, 2002). In the interviews, the researcher traveled to the participants’ schools and used a location where the subject felt comfortable talking. Similar procedures were used at each school in order to maintain consistency (Creswell, 2003; Fraenkel & Wallen, 2009; Vaughn et al., 1996). However, biases may have existed within participants through impression management, intimidation in some group members, or increased verbalization from some individuals. Researcher biases may also have been introduced—for example, by being too close to the research problem, conducting multiple focus groups and having preconceived notions of what the researcher wants to hear (or what was said in the past), not probing when the researcher should have due to
fatigue, or relaying too much information about the study. A researcher
subjectivity statement, therefore, was provided (Appendix I). Teachers may have
also been reluctant to contribute due to fatigue at the end of the year, fear of lack
of anonymity, and political issues within their departments. 

**Data Analysis**

For the survey, descriptive data were analyzed using SAS software, and t-
tests for differences were performed using Microsoft Excel. Phenomenological
study protocol was followed as described in Creswell (1998). Qualitative data
from open-ended response questions on the surveys were unitized, as well as
statements made by participants in the interviews. Unitizing included color-
coding each interview on separate sheets of paper, then cutting the statements into
strips. These units were then placed into piles as themes emerged. The initial
categories generated included the following: (1) Staff Development, (2) Benefits,
(3) Drawbacks, (4) Improvements Needed, (5) How Teaching Experiences Had
Changed, (6) General Opinions, (7) School Climate, (8) Time Issues, and (9)
Materials Needed. Further data reduction led to these categories: (1) Block
Improvements Needed, (2) Resources Needed, (3) Disadvantages, (4) AP
Program Issues, (5) End-of-Course Class Issues, (6) Experience Level of the
Teacher, (7) Schedule Type, (8) Calendar Issues, (9) Teaching Methods, (10)
Planning Period Use, (11) Staff Development Needs, (12) Types of Students, and
(13) Advantages. The last round of reduction and regrouping of categories led to
(1) Professional Development Needs, (2) Instructional Influences, (3) Subject Area Differences, (4) Schedule Type, (5) Student Type, (6) Student Accountability, (7) Resources, (8) Planning Period Use, and (9) Final Decisions. From each of these major categories, sub-categories could be developed based upon factors such as teachers’ daily experiences, teachers’ overall experiences, teachers’ interdependence on others, and how teachers’ experiences had changed over the course of four years since the block implementation. These themes included: (1) With Limited Time, Enrichment Tends to be Cut With Block Instruction, Managing Assessments Magnifies With Block Instruction, (3) AP Courses are a Double-Edge Sword on the Block Schedule, (4) Parkinson’s Law Can Steal Time With the Block Schedule, (5) Managing Student Paperwork Intensifies With Block Scheduling, (6) Teachers’ Beliefs on Student Success With the Block Schedule Vary Based on the Population Taught, (7) School Climate Influences Teachers’ Experiences With the Block Schedule, (8) Science Teachers Highly Value the Block Planning Period, (9) Planning for Instructional Transitions is a Necessary Skill on the Block Schedule, (10) The Need for Instructional Materials Increases With Block Instruction, (11) The North Carolina Curricula and Pacing are Problematic for Many Block Science Teachers, (12) Processing Time and Retention of Material are Hindered With the Block Schedule, (13) Teachers’ Relationships With Students May be More Fleeting With the Block Schedule, (14) 4X4 Teachers Appreciate the Fresh Start of the

Finally, a graphic organizer (Figure 5.1) was created to portray the essence of science teachers’ experience with the block schedule. This chapter has explained the mixed methodology used in this study. The next chapter presents the results obtained using these methods.
CHAPTER 4 – RESULTS

Introduction

As stated in Chapter 1, the study reported here examined these research questions:

1. Is there a difference in science teaching methods used between End-of-Course and Non-End-of-Course teachers with the block schedule?

2. Is there a difference in science teaching methods with respect to teacher experience level (number of years teaching) with the block schedule?

3. Had science teachers’ instructional methods changed since the implementation of the block schedule?

4. What were science teachers’ current perceptions, attitudes, and feelings about the block schedule as it relates to instruction, school climate, and time/materials management?

5. What were science teachers’ perceived benefits and losses in changing to the block schedule?

6. What were the perceived current needs of science teachers to successfully continue the block schedule?

7. How have science teachers’ experiences changed over the past four years with the implementation of the block schedule?
This chapter summarizes the results of these questions. The first section

describes the sample that participated in the study. The remaining sections
combine the findings from the survey questions, open-ended responses, and focus
group data. The results are organized by research question.

### Description of the Study Sample

The survey sample included 155 of 224 Wake County science teachers. Years experience ranged from less than one year to 43 years. The median years experience was seven, while the mean was 10. The range of this sample is displayed in Figure 4.1.

![Figure 4.1. Years of Teaching Experience](image)

*Figure 4.1. Years of Teaching Experience*
A breakdown of teacher gender included 108 (70%) female teachers and 47 (30%) male teachers. In addition, 129 (83%) teachers were traditionally licensed, while 26 (17%) were lateral entry certified. In terms of pre-service education, 56 (36%) reported having received instruction on the block schedule in college, while 98 (64%) stated they had received no training. In terms of teacher preparation, 90 (58%) teachers reported that their education occurred in North Carolina, while 64 (42%) stated that their teacher education occurred in another state. Finally, Table 4.1 lists the breakdown of subjects represented in the surveys. Note that some teachers may teach more than one subject. Teachers participating in the focus group interviews are listed in Appendix J. Teacher names and school names were changed to protect anonymity.
Research Question 1

Is there a difference in science teaching methods used between End-of-Course and Non-End-of-Course teachers with the block schedule?

Results of Research Question 1

Research question 1 results were obtained from the survey data. In this section, there were 23 separate pair-wise comparisons for this analysis, because there were 23 items in the Likert scale. The probability that there is a difference occurring by chance increases with the number of comparisons. Therefore, instead of choosing an alpha level of 0.05 for determining any differences in the pair-wise comparisons, an alpha level of 0.005 was used. This resulted in the following categories being classified as having differences between EOC and Non-EOC courses: outdoor activities, projects (assigned for less than a week), guest speakers, media center visits, and long-term projects (assigned for more than a week).
Table 4.1

*Distribution of Subjects Taught*

<table>
<thead>
<tr>
<th>Subject</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>66</td>
</tr>
<tr>
<td>Earth Science</td>
<td>57</td>
</tr>
<tr>
<td>Chemistry</td>
<td>30</td>
</tr>
<tr>
<td>Physical Science</td>
<td>26</td>
</tr>
<tr>
<td>Anatomy</td>
<td>14</td>
</tr>
<tr>
<td>Physics</td>
<td>12</td>
</tr>
<tr>
<td>AP Environmental Science</td>
<td>12</td>
</tr>
<tr>
<td>AP Biology</td>
<td>9</td>
</tr>
<tr>
<td>Forensics</td>
<td>8</td>
</tr>
<tr>
<td>Other Electives</td>
<td>25</td>
</tr>
</tbody>
</table>

The next table, Table 4.2 shows the differences in average scores sorted by p-value for the survey.
Table 4.2

*Average Response Score Sorted by P-Values*

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>Non-EOC Average</th>
<th>EOC Average</th>
<th>P (two tail)</th>
<th>% of Non-EOC Agree and Strongly Agree</th>
<th>% of EOC Agree and Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Activities</td>
<td>3.15</td>
<td>2.41</td>
<td>0.000008</td>
<td>44.3</td>
<td>19.2</td>
</tr>
<tr>
<td>Projects</td>
<td>3.55</td>
<td>2.98</td>
<td>0.000861</td>
<td>65.9</td>
<td>41.1</td>
</tr>
<tr>
<td>Guest Speakers</td>
<td>2.66</td>
<td>2.19</td>
<td>0.002102</td>
<td>21.6</td>
<td>12.3</td>
</tr>
<tr>
<td>Media Center Visits</td>
<td>3.25</td>
<td>2.77</td>
<td>0.003061</td>
<td>55.2</td>
<td>36.2</td>
</tr>
<tr>
<td>Long-Term Projects</td>
<td>3.13</td>
<td>2.62</td>
<td>0.004711</td>
<td>46.0</td>
<td>29.9</td>
</tr>
<tr>
<td>Labs</td>
<td>3.91</td>
<td>3.54</td>
<td>0.016763</td>
<td>74.7</td>
<td>61.2</td>
</tr>
<tr>
<td>Performance Assessments</td>
<td>3.45</td>
<td>3.12</td>
<td>0.018227</td>
<td>59.1</td>
<td>44.6</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>3.33</td>
<td>3.00</td>
<td>0.027888</td>
<td>52.3</td>
<td>43.1</td>
</tr>
<tr>
<td>Cooperative Learning</td>
<td>3.87</td>
<td>3.64</td>
<td>0.044604</td>
<td>81.6</td>
<td>69.8</td>
</tr>
<tr>
<td>Role-Playing</td>
<td>2.45</td>
<td>2.17</td>
<td>0.066202</td>
<td>17.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Group Discussion</td>
<td>3.44</td>
<td>3.20</td>
<td>0.094521</td>
<td>61.4</td>
<td>47.7</td>
</tr>
</tbody>
</table>
Table 4.2 Continued

*Average Response Score Sorted by P-Values*

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>Non-EOC Average</th>
<th>EOC Average</th>
<th>P (two tail)</th>
<th>% of Non-EOC Agree and Strongly Agree</th>
<th>% of EOC Agree and Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silent Reading In Class</td>
<td>2.24</td>
<td>1.99</td>
<td>0.100397</td>
<td>15.9</td>
<td>9.4</td>
</tr>
<tr>
<td>Teacher Demonstrations</td>
<td>3.36</td>
<td>3.58</td>
<td>0.142488</td>
<td>53.4</td>
<td>66.2</td>
</tr>
<tr>
<td>Problem-Based Learning</td>
<td>3.46</td>
<td>3.26</td>
<td>0.175182</td>
<td>55.2</td>
<td>46.5</td>
</tr>
<tr>
<td>Technology</td>
<td>3.58</td>
<td>3.38</td>
<td>0.185211</td>
<td>65.1</td>
<td>52.3</td>
</tr>
<tr>
<td>Field Trips</td>
<td>2.09</td>
<td>1.92</td>
<td>0.207189</td>
<td>5.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Activities</td>
<td>3.94</td>
<td>3.81</td>
<td>0.315398</td>
<td>76.1</td>
<td>70.8</td>
</tr>
<tr>
<td>Individual Seatwork</td>
<td>3.25</td>
<td>3.12</td>
<td>0.386249</td>
<td>46.6</td>
<td>43.8</td>
</tr>
<tr>
<td>Homework Assigned in Class</td>
<td>3.31</td>
<td>3.17</td>
<td>0.400154</td>
<td>59.8</td>
<td>52.3</td>
</tr>
<tr>
<td>Seminars</td>
<td>2.51</td>
<td>2.45</td>
<td>0.679420</td>
<td>11.6</td>
<td>10.9</td>
</tr>
<tr>
<td>Simulations</td>
<td>3.45</td>
<td>3.40</td>
<td>0.708972</td>
<td>55.7</td>
<td>55.4</td>
</tr>
<tr>
<td>Lectures</td>
<td>3.14</td>
<td>3.18</td>
<td>0.745332</td>
<td>46.6</td>
<td>43.8</td>
</tr>
<tr>
<td>Team Teaching</td>
<td>2.56</td>
<td>2.53</td>
<td>0.893186</td>
<td>26.7</td>
<td>27.9</td>
</tr>
</tbody>
</table>
A graph of the responses for the difference in implementing outdoor activities is shown in Figure 4.2. The Non-EOC average was 3.15 and the EOC average was 2.41.

![Graph showing response distribution for outdoor activities](image)

*Figure 4.2. Response Distribution for "Since moving to the block schedule I use more outdoor activities."*

About half of teachers of EOC courses disagreed or strongly disagreed with this statement, whereas nearly half of the teachers of the Non-EOC courses agreed or strongly agreed.

In the interviews, one AP Environmental Science teacher stated:

The lab time is definitely a plus, especially with AP and also there is time to go outside. With the 90 minutes, there appears to be time to get organized, go outdoors, complete an experiment, and return to the building.
A graph of the responses for the difference in implementing projects is shown in Figure 4.3. The Non-EOC average was 3.55, and the EOC average was 2.98.

Figure 4.3. Response distribution for "Since moving to the block schedule I use more projects."

The teachers of EOC courses seem to be divided on this item, generally having similar responses across level of agreement. However, 65% of the teachers of Non-EOC courses reported that they do use more projects since moving to the block schedule.

From the qualitative data, teachers gave these reasons for using fewer projects in EOC courses: (1) they needed the allocated time to cover the basics of
the curriculum, (2) they needed time to focus on direct instruction versus additional time it would take for student-centered methods, (3) both EOC and Non-EOC teachers described roadblocks to assigning projects (for example, having overloaded extra curricular activities, resource and materials issues, and lack of transportation to work with project partners), and (4) teachers of EOC courses mentioned pacing issues being problematic because they felt there was not a lot of extra time for enrichment such as projects.

The difference in responses for guest speakers is displayed in the following graph, Figure 4.4. The Non-EOC average was 2.66, while the EOC average was 2.19. Although there is a significant difference between the average response between the two groups, both groups tend to disagree with the statement.

There was not much mentioned in the focus groups as to the reasons why EOC teachers use fewer guest speakers. One insight did come from a Chemistry teacher who explained not having time with the block schedule:

I hate that we miss out on what I used to do is have guest speakers at NC State…College of Textiles used to come all the time. From that one program, we would always get kids interested and they would get scholarships to College of Textiles…now we say, we don’t have time. We’ve got to get the curriculum covered.
Figure 4.4. Response distribution for "Since moving to the block schedule I use more guest speakers."

Responses to the statement regarding media center visits also indicated a significant difference between EOC and Non-EOC teachers. The Non-EOC average was 3.25, and the EOC average was 2.77 (Figure 4.5). Over 55% of the Non-EOC teachers agreed that they used the media center more frequently, but only 36% disagreed with the statement.
One AP Environmental Science teacher described the media center issue in terms of logistics with the block schedule.

You have to figure only eight teachers a day can use the media center, two teachers a period, if we weren’t teaching in there…eight teachers out of a staff of 120…The library books up by period. So…in traditional you had seven periods all year…now only four. Now we have classes in the library.

Some teachers reported having scheduling trouble getting in to use the media center. Teachers mentioned how this differed from students making use of the media center under the traditional calendar.

**Figure 4.5.** Response distribution for "Since moving to the block schedule I use more media center visits."
Whereas that would also happen on traditional, on block you have less
time to do a project...so when you condense that time...when they are
sick for one or two days or they can’t get off work one or two days...they
might have a week and a half to do the project on traditional.

Some schools have opted to allow more teachers media center time by
shortening the block to 45-minute increments, thereby allowing more classes in
the media center. However, a Biology teacher offered this dilemma:

How many activities do you have that by the time you get down there, get
them in their seats, log in, only take the 45 minutes?

From the focus group interviews, possible reasons for not using the media
center for all teachers include both: (1) logistical or overcrowding issues with
classes meeting in the media center since changing from a period to a block
schedule and, (2) some media centers breaking the block into two separate 45
minute segments. This allows more classes to visit the media center but cuts
down on the amount of time students have access to the center. A possible
additional reason why EOC teachers do not use the media center more is
scheduling or planning dilemmas with too little time to expand topics. For
example, a Physics teacher offered this insight:

I’ve taught EOC and Non-EOC. When I was teaching EOC, I felt very
rushed... and could not expand out and do fun activities with the students.
In a Non-EOC, I like the block schedule more. I felt like I had more time
to do things I couldn’t do because I need to get to all the chapters in an
EOC and don’t have time for frills and various activities.
Finally, a graph showing long-term projects differences is displayed in Figure 4.6. The Non-EOC average was 3.13, and the EOC average response was 2.62. Although there is a significant difference in the average response between the two groups, the distributions are similar. Over 50% of the teachers of EOC courses disagreed with the statement. The results regarding “long-term projects” is not surprising, since there was also a difference regarding “projects.”

*Figure 4.6. Response distribution for "Since moving to the block schedule I use more long-term projects."*
As far as projects, two EOC teachers described the problem as having no
time to explore students’ interests in long-range projects for Non-EOC versus
EOC courses.

It’s not as scary for kids to go off on a tangent that is legitimate in some
subjects. In Earth Science...they wonder how to do things, they want to
know things and you have time to do that...so it’s not as scary that you
might not get to the end of the curriculum. Whereas in Biology sometimes
I feel like I’m not answering their questions fully just because I feel like
they’re off topic. I feel like they are good questions and they deserve to be
answered but at the same time you just don’t feel like you can answer
what you should.

I feel here I have to fit so much into the 90 minutes...because I don’t want
to give kids too much to do outside of class because it’s such a quick
turnaround. We start a new unit every eight school days. There’s not a lot
of time to work on things outside of class that are meaningful. If I give
this quick feedback, they have to do it in class, so I give up class time for
something else. On traditional schedule, kids had time to work on things
outside of class and they were more independent learners.

A Biology teacher described the difference in terms of needing to teach
the basics and not being able to expand on topics in EOC classes.

With the EOC classes, we have to get through everything, no matter what.
With Biology, we have had to cut down and shrink how much time we are
spending on stuff, and give them the basics and go. For Marine Ecology,
in there if I don’t get to something, I don’t get to it... oh well. I can spend
more time on something that I am more interested or the kids are more
interested in and do more projects…I can take a day to go over concepts
the kids don’t understand. You can’t do that in an EOC course.

In contrast, a teacher who only taught Non-EOC explained her projects
and reasons for doing projects in terms of a desire to vary instruction.
I found myself doing more hands-on kinds of things, even more arts-and-craftsy kinds of things. It works well with Earth Science so they get a break from direct instruction.

A Chemistry teacher and an AP Biology teacher, respectively, who wanted to do class projects described these problems due to students being overloaded with their overall work load, lack of technology and materials access, and course pacing issues.

I think the other thing is, it was originally sold as we would have all this time to do projects and labs and now this is becoming false. Now the kids are overloaded and it has gone to the extreme. We are overcompensating from the loss of time by assigning projects and they are not getting the benefits of block scheduling.

In the first place when the block schedule was introduced, one thought was to have more technology and to allow the students to have a lot of hands-on experiences. However, if there are no materials or we run out of materials, there is more time, kids are bored, it’s hard to engage them for 90 minutes. Students get bored unless there are a variety of activities. The problem I see with block scheduling is…that kids are getting bored.

Finally, one Earth Science teacher discussed the pitfalls of assigning a long-term project in his course because of having certain types of students, not necessarily because it was a Non-EOC course.

If you’re going to make a big project like that, it’s going to have a heavy weight percentage…if you’re going to do that in an Academic class, they aren’t going to do it because of the amount of work it entails…you put down a zero for that…all of a sudden, Johnny can’t pass, so what’s he going to do for the rest of the time?

From the focus group interviews, EOC teachers mentioned these reasons for not implementing long-term projects (1) They felt they had too little time for
exploring student interest, given the amount of content they had to teach. They also felt they lacked time to go into depth with material, and (3) For all teachers, when some students do not complete long-term, heavily-weighted projects, this can have serious grade consequences.

Table 4.3 displays the breakdown differences of whether teachers agreed with using more of a particular teaching method on the block schedule. Although some methods (cooperative learning, projects, performance assessments, media center visits, peer teaching, long-term projects, outdoor activities, and guest speakers) prompted significant differences in the average response, many methods had large agreement to the statements across both groups. Methods that had a large agreement included cooperative learning, activities, and labs. Several teachers indicated that whether they could utilize more student-centered methods depended on flexibility and accountability with the curriculum. For instance, in Non-EOC courses, there is no state test. Teachers are expected to teach the curriculum; but if they run out of time or need to expand on material, the consequences are not as great compared to those in an EOC class.
## Table 4.3

*Average Response Score Sorted by Percent of Agreement with Statement by Non-EOC Responders*

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>Non-EOC Average</th>
<th>EOC Average</th>
<th>P (two tail)</th>
<th>% of Non-EOC Agree and Strongly Agree</th>
<th>% of EOC Agree and Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative Learning</td>
<td>3.87</td>
<td>3.64</td>
<td>0.044604</td>
<td>81.6</td>
<td>69.8</td>
</tr>
<tr>
<td>Activities</td>
<td>3.94</td>
<td>3.81</td>
<td>0.315398</td>
<td>76.1</td>
<td>70.8</td>
</tr>
<tr>
<td>Labs</td>
<td>3.91</td>
<td>3.54</td>
<td>0.016763</td>
<td>74.7</td>
<td>61.2</td>
</tr>
<tr>
<td>Projects</td>
<td>3.55</td>
<td>2.98</td>
<td>0.000861</td>
<td>65.9</td>
<td>41.1</td>
</tr>
<tr>
<td>Technology</td>
<td>3.58</td>
<td>3.38</td>
<td>0.185211</td>
<td>65.1</td>
<td>52.3</td>
</tr>
<tr>
<td>Group Discussions</td>
<td>3.44</td>
<td>3.20</td>
<td>0.094521</td>
<td>61.4</td>
<td>47.7</td>
</tr>
<tr>
<td>Homework Assigned</td>
<td>3.31</td>
<td>3.17</td>
<td>0.400154</td>
<td>59.8</td>
<td>52.3</td>
</tr>
<tr>
<td>Class Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Assessments</td>
<td>3.45</td>
<td>3.12</td>
<td>0.018227</td>
<td>59.1</td>
<td>44.6</td>
</tr>
<tr>
<td>Simulations</td>
<td>3.45</td>
<td>3.40</td>
<td>0.708972</td>
<td>55.7</td>
<td>55.4</td>
</tr>
<tr>
<td>Media Center Visits</td>
<td>3.25</td>
<td>2.77</td>
<td>0.003061</td>
<td>55.2</td>
<td>36.2</td>
</tr>
<tr>
<td>Problem-Based Learning</td>
<td>3.46</td>
<td>3.26</td>
<td>0.17182</td>
<td>55.2</td>
<td>46.5</td>
</tr>
</tbody>
</table>
Table 4.3 Continued

*Average Response Score Sorted by Percent of Agreement with Statement by Non-EOC Responders*

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>Non-EOC Average</th>
<th>EOC Average</th>
<th>P (two tail)</th>
<th>% of Non-EOC Agree and Strongly Agree</th>
<th>% of EOC Agree and Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Demonstrations</td>
<td>3.36</td>
<td>3.58</td>
<td>0.142488</td>
<td>53.4</td>
<td>66.2</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>3.33</td>
<td>3.00</td>
<td>0.027888</td>
<td>52.3</td>
<td>43.1</td>
</tr>
<tr>
<td>Lectures</td>
<td>3.14</td>
<td>3.18</td>
<td>0.745332</td>
<td>46.6</td>
<td>43.8</td>
</tr>
<tr>
<td>Seatwork</td>
<td>3.25</td>
<td>3.12</td>
<td>0.386249</td>
<td>46.6</td>
<td>43.8</td>
</tr>
<tr>
<td>Long-Term Projects</td>
<td>3.13</td>
<td>2.62</td>
<td>0.004711</td>
<td>46.0</td>
<td>29.9</td>
</tr>
<tr>
<td>Outdoor Activities</td>
<td>3.15</td>
<td>2.41</td>
<td>0.000008</td>
<td>44.3</td>
<td>19.2</td>
</tr>
<tr>
<td>Team Teaching</td>
<td>2.56</td>
<td>2.53</td>
<td>0.893186</td>
<td>26.7</td>
<td>27.9</td>
</tr>
<tr>
<td>Guest Speakers</td>
<td>2.66</td>
<td>2.19</td>
<td>0.002102</td>
<td>21.6</td>
<td>12.3</td>
</tr>
<tr>
<td>Role Playing</td>
<td>2.45</td>
<td>2.17</td>
<td>0.066202</td>
<td>17.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Silent Reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Class</td>
<td>2.24</td>
<td>1.99</td>
<td>0.100397</td>
<td>15.9</td>
<td>9.4</td>
</tr>
<tr>
<td>Seminars</td>
<td>2.51</td>
<td>2.45</td>
<td>0.679420</td>
<td>11.6</td>
<td>10.9</td>
</tr>
<tr>
<td>Field Trips</td>
<td>2.09</td>
<td>1.92</td>
<td>0.207189</td>
<td>5.7</td>
<td>2.3</td>
</tr>
</tbody>
</table>
The Non-EOC teachers scored higher on level of agreement for all instructional methods that were significantly different between the two groups. The pattern continues among the rest of the instructional methods. The percentage of respondents who checked “agree” or “strongly agree” demonstrated a high correlation between the teachers of Non-EOC and teachers of EOC courses on all instructional methods ($r = 0.92$, $p < 0.01$), meaning that although the average score on some items showed differences, the responses of both groups on all instructional methods were similar.
Research Question 2

Is there a difference in science teaching methods with respect to teacher experience level (number of years teaching) with the block schedule?

Results of Research Question 2

The teachers’ responses to the survey section on methodology were divided into quartiles with respect to the teachers’ experience level. As previously shown in Figure 4.1, most of the teachers completing the survey had 10 years of experience or less. Therefore, the range of experience in each quartile was not equal. Since there was a total of 155 teachers responding to the survey, the number of teachers in each quartile ranged from 38-39 teachers. The range of teaching experience for each quartile is displayed in Table 4.4.

Table 4.4

Quartile Divisions with Respect to Teaching Experience

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Years of Teaching Experience</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-3</td>
<td>39</td>
</tr>
<tr>
<td>2</td>
<td>4-7</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>8-13</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>14-44</td>
<td>39</td>
</tr>
</tbody>
</table>
By the time the survey was administered, the school system had completed three years on the block system. Therefore, all teachers in the first quartile who worked for the school system had always been on the block system. Only the second, third, and fourth quartile teachers were included in this comparison, since the survey stem stated, “Since moving to the block schedule, I use more...”. It was assumed that the teachers in the first quartile had not moved to the block schedule, but began their teaching careers there.

Figure 4.6 displays the trend of how each quartile group answered the items. The level of agreement was converted to numbers for the analysis (strongly agree = 5, agree = 4, no opinion = 3, disagree = 2, strongly disagree = 1). The graph was arranged so that “Instructional Method” was listed from highest agreement to lowest agreement by teachers with 4-7 years experience. There appears to be a consistent difference between the least experienced group and the most experienced group. The group with 4-7 years experience appears to have an overall higher level of agreement than the group with 14-43 years experience on each of the instructional methods surveyed. However, the third quartile with 8-13 years experience sometimes agrees with the less experienced teachers, and other times agrees with the more experienced teachers.
Figure 4.7. Trend of the level of agreement with instruction method by teacher experience across all instruction methods.

The graph in Figure 4.7 displays a certain amount of parallelism among the three quartiles. There is a significant correlation among all three quartiles of experience. This means that if there is a high level of agreement on one instructional method from one group, the other groups reflect a similar level of agreement. Note that the highest correlation is with 4-7 years experience and 14-43 years experience (Table 4.5).
Table 4.5

*Correlation Matrix Among All Responses for the 2nd, 3rd, and 4th Quartile Based on Years Experience Across All Instructional Methods*

<table>
<thead>
<tr>
<th>Years Experience</th>
<th>4-7 years</th>
<th>8-13 years</th>
<th>14-43 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-7 years</td>
<td>1.00</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8-13 years</td>
<td>0.88</td>
<td>1.00</td>
<td>---</td>
</tr>
<tr>
<td>14-43 years</td>
<td>0.97</td>
<td>0.91</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Although there is high correlation of the level of agreement across all instructional methods, there are significant differences in responses for given instructional methods when comparing the 4-7 years experienced teachers with the 14-43 years experienced teachers. The 4-7 years experienced teachers show a higher level of agreement when asked if they use more paideia, peer teaching, or assigned homework during class time (alpha > 0.005). They also show a higher level of agreement when asked if they use more role playing, and seatwork (alpha = 0.01). Thirteen other methodologies show a difference at the alpha = 0.05 level, where the 4-7 years experienced teachers continue to show a higher level of agreement. Only performance assessment, laboratories, demonstrations, technology, and guest speakers showed no difference in responses between the 4-7 years experienced teachers and the 14-43 years experienced teachers. This
overall picture suggests that the more experienced teachers changed less than the
less experienced teachers across most listed instructional methodologies as a
result of being on the block schedule.

This data must be interpreted in light of the magnitude of the agreement,
not just level-of-agreement differences. For example, there is a significant
difference in the level of agreement with the statement that teachers use field trips
more often as a result of being on block scheduling, but the average response for
both is close to the “Disagree” response (2 on the scale). Both groups disagree
with the statement, but the 14-43 years experienced teachers disagree significantly
more.
Research Question 3

Had science teachers’ instructional methods changed since the implementation of the block schedule?

Results of Research Question 3

For the remaining research questions, qualitative data from the focus group interviews and from the open-ended survey responses were used as the primary means to gather data. From the qualitative interviews and focus groups, data were transcribed, and each data source was printed out using different colors. These colors allowed the researcher to know where the data were coming from (for instance, which school). Next, the statements were unitized by cutting them up into strips of paper. Then, the data were sorted into piles based on similar topics or issues. Within each topic or issue, the researcher examined the statements to look for connections, causation, relationships, and patterns. From here, these themes emerged: (1) With Limited Time, Enrichment Tends to be Cut With Block Instruction, (2) Managing Assessments Magnifies With Block Instruction, (3) AP Courses are a Double-Edged Sword on the Block Schedule, and (4) Parkinson’s Law Can Steal Time With the Block Schedule.

With Limited Time, Enrichment Tends to be Cut with Block Instruction

When teachers change from a traditional to a block schedule, seat time is lost in the overall semester. Teachers recognize that they simply cannot paste two traditional 50-minute classes together, or else they would lecture for longer than
the teenage attention span would allow. Therefore, restructuring lessons is necessary. From the survey, when teachers were asked to respond to the statement, “I restructured my lesson plans when we changed to block scheduling” 68% agreed with this statement, while 31% responded neutrally. In addition, when asked to consider the statement, “I have implemented new teaching strategies on the block schedule,” 80% of teachers agreed with this statement, while 16% responded neutrally. When the restructuring of lessons occurs, teachers make decisions on how to change instruction, or where to cut content and methods. Some teachers reported that these changes occurred in lecture, reducing labs, the “fun stuff,” inquiry learning, and time to concentrate on the strands (such as the nature of science); In other words, the enrichment portion of the courses in which students explored or expanded on topics.

Since lectures are usually a primary method by which teachers convey information, teachers were asked about this practice. From the focus group interviews, teachers offered several additional insights. In terms of instruction, teachers mentioned how they had made changes:

Here’s how I’ve changed my lecture…It used to be, “Simmer down, be quiet…write down my 10 ideas…here’s my 10 definitions.” Now we have to keep their interest more so it has to be interactive. So I think it’s actually made me a better lecturer.

My lectures have taken a different form…they’re still lectures but they are more interactive lectures…as opposed to just a presentation, it’s a presentation with a discussion.
However, in terms of the instructional laboratory, science teachers discussed having students engaged in less lab time.

I don’t find I’m doing as many labs as I used to. If I’m average, I can get a lab a week in. Sometimes more…sometimes less. That cuts the number of labs I’m doing in half on a block versus traditional schedule.

I can’t do as many labs as I would prefer to do because I have to get all the information in. I don’t have time to do that lab because they need that information.

Even with the A/B calendar where teachers have students for the entire year, less lab time was still an issue.

It also skips a day for us. We skip a whole day when they come back…there is less contact time and a lot of people had to cut out material such as labs.

However, not all teachers felt they taught using less laboratory experiences.

A lot of labs I do I would not be doing if not on block.

It hasn’t helped me in Biology labs, but now in Chemistry, I can do the pre-lab the day of.

Seven teachers additionally reported on the open-ended survey more labs were being used. When comparing this data to that of Part C of the survey (data used for research questions 1 and 2), most teachers stated that they do more labs (see Table 4.3). Also, one common theme that permeated the focus group interviews across schools was reporting that teachers’ classes were “less fun” with the block schedule.
In Chemistry we’ve talked about how we cut out all the fun stuff. And the kids love nuclear energy. You start talking nuclear and everybody is ready to join in. It’s something we’ve had very little of and we spend a half a day on it. That’s sad that we can’t offer them that...but as far as the curriculum it’s a good curriculum, you just don’t have time to cover it.

I feel like every fun activity has been pulled out of my curriculum...yeah we do a fun thing here or there, but that’s the stuff they remember and I feel like I don’t have time to get to that because the standards are so beyond ridiculous that there is no way we are going to get to that.

Coming from non-block to block this year, on traditional I had no trouble covering everything I needed to and I had fun activities...now I think my class is infinitely less fun because I had to cut all of that out just because I don’t have the time to cover everything.

These comments also appeared in the open-ended survey responses:

It’s tougher to fit in the “fun stuff” ---special projects that put the learning to use in a fun way. For example, design a structure (& build) that can withstand an earthquake & test it on an earthquake table. It’s fun, it’s valid, but it’s time-consuming & need the entire class period (or 2) & our race to the finish is tight.

The curriculum is streamlined and bare bones! I really have less time for projects and creativity from students.

Related to changes in labs were statements made about inquiry-based learning. This indicated that this was also a method that had been cut more from instruction.

I think it basically killed inquiry-based learning because...it takes so long to develop and you just don’t have the time. Previous to the block schedule, previous to EOC’s even, we had plenty of time to cover basically the same objectives that the EOC has and we had more time to discover things as well.

I found I cut out inquiry. When students have questions, you have to tell kids the answers instead of asking them a question until they have a chance to figure it out on their own.
These comments also appeared on the open-ended survey responses:

I’ve gone back to more lecture (but I do it more discussion style)- Not enough time for a lot of student inquiry – self discovery.

One additional loss in the curriculum with the change to block included less time for teachers to focus on the nature of science.

I miss the time to concentrate on strands. For whatever reason I think a lot of children get to high school and do not understand concepts like science as an endeavor, broad science knowledge, public knowledge…and all of the basic principles that help us to teach the subject matter…and it detracts from their ability to perform well on the EOC. It becomes a fight…a conflict…I have taught Honors Biology…in an EOC course.

Additional issues mentioned in the open-ended survey responses included: selectivity about choosing the labs/activities. With limited time, teachers must decide whether the lab is worth spending time on in class and whether the lab goals truly align with the Standard Course of Study. Positive aspects teachers reported were the use of more of a variety of assessments, use of more graphic organizers, an opportunity to get rid of ineffective assignments, and the use of interactive science notebooks. Negative or Neutral aspects included assigning less homework because students were not completing it, notes being handed out to students, less emphasis being placed on higher-level thinking activities, and bookwork being assigned more at home. Finally, when teachers were asked on the survey if they were comfortable with their teaching methods since changing to the block, 71% of teachers agreed with this statement, while 11% disagreed.
Managing Assessments Magnifies on the Block Schedule

With the pace of the block schedule coupled with lost seat time, managing assessments, such as tests can become problematic for teachers. The dilemmas teachers face are: (1) When to administer the test (at the beginning or end of the block), (2) Calendar issues for state and national AP exams, (3) How often to test, (4) Taking more time out of the schedule for testing instead of being able to teach content, and (5) The expectation that teachers use alternative or authentic assessments with the block schedule, given that they have more time within a class period. When teachers were asked to respond to the statement, “I include more of a variety of assessments since the implementation of the block scheduling,” 38% of teachers disagreed with this statement, while 46% of teachers agreed. Teachers did mention several concerns about testing on the block schedule in both EOC and Non-EOC classes because of the time it takes to test students also takes away from teaching the curriculum. Teachers cope with this loss of time in a variety of ways.

I find I have to do it this way. I hand it to them when they walk in the door. They have no time to get organized. I tell them they have 50 minutes, then time is up. Most of the time, they’ll finish…but there are some kids I know I’m rushing.

The other thing is when you have a new topic, you don’t like for them to wait two days. I’ve been trying to do this all along. I give them new material the day of the test, then they take the test. The kids can’t stand it…they just shut down and won’t take a note…
I still had to apologize to them today [during the bomb threat]… they’re out for an hour… My kids sat out there on the lawn taking their test because…there’s a dissection I want to do. If you want to do this lab, I have to push you…because that is the only way we’ll have time…you’re sitting there trying to hold a carrot in front of them to say, “Hey, stick with me and you’ll get to do this lab...” and it’s not fun.

Even in Earth Science, you have to group two unrelated categories for a test just because you have to go over a chapter in two days, just to get it all through.

Compared to the traditional calendar, teachers stated they were testing every other week and they could give smaller, more frequent assessments.

When we were on traditional, I used to have time to give a little quiz on material so they could check…but you don’t have time to do quizzes as much like you used to. I used to always do several quizzes within a unit…

One additional dilemma to testing students on the block was the issue of special education student considerations and extended time.

I don’t time mine at all. With my ICR [In Class Resource students], most have extended time. But even honors kids, I review beforehand and give them something they can work on after. It’s something they can read and do whether it’s five or 20 minutes after, they are going to do something… because I’ve just found that it’s harder for me to actually start teaching… so I don’t fight that battle anymore.

Another issue was the matter of testing and retention of material on the block schedule.
(angrily) Let me speak, because I have taught them all. They are memorizing for the test. When I ask them about a concept that we’ve covered a couple of weeks or months ago they just stare at me. They are memorizing for the test…they are not assimilating information…they are not retaining information. Block scheduling is producing an illiterate uneducated group of people. I have neighbors who have children who have finished high school that are coming to the same conclusion. Block is not a good idea. It is not good for all students across the board. I ask my AP students something from first semester or January, and they cannot answer basic questions. Advanced…Academic…it does not matter…

…They have even told me they are memorizing for the test. There is so much they have to do in such a short turnaround time on the block schedule. This is a college schedule, but college does not meet every single day. This is a college schedule meeting every single day. They do not have time to read a 40-page chapter, every other night, learn the information, do the study guide, and then do the assigned test on the syllabus…and know what they are doing!

**AP Courses are a Double-Edged Sword on the Block Schedule**

Testing in an AP course presents its own unique issues on a block schedule. Because of the loss in calendar time, and the fact that the College Board only tests students in May, teachers on the 4X4 block schedule face a double-edged sword. Students can take a class in the fall, but then they have four months until they test or students can take a class in the spring, and have less time to master the material.

The big thing with AP obviously is stopping in January and testing in May…and then I have to do reviews every week after school. I don’t have to but I do them. It’s killing the AP scores.

I would have to say that with AP exams, in Physics having it in a single semester adds a double whammy – to teach it in the fall or spring. In my case, the course didn’t start until February. I had 3+ months to teach a year-long college class since the exam was May 8th. It’s impossible.
With 30 less hours…in AP Biology, you notice the 30 less hours. In Biology, I can’t give my mini-tests, I have to give the big ones.

To compensate, 4X4 schools learned quickly to pair a course, such as Research Methods or another AP class, thereby making the course year-long. However, one AP teacher noted a major difference between EOC and AP courses as such:

One difference between the AP exam and the EOC is the AP exam is optional…so in the end, I felt like I could teach the kids and if they didn’t want to take the exam, they still had a good Physics experience. The AP exam would not necessarily kill them. But you don’t have that option with the EOC. It’s not optional.

One positive mentioned was the length of time the block provides for the AP testing practice:

I would almost put this down as a benefit in my exam time…the flexibility for AP. I can give them two sections: multiple choice and a free response section.

**Parkinson’s Law Can Steal Time on the Block Schedule**

The role of Parkinson’s Law (work expands to fill the time available) became very evident as teachers addressed their experiences not only with testing on the block, but with other classroom activities as well. As students think they have 90 minutes to complete assignments, they feel they are entitled to this time and do not see the hurry to complete their work within shorter time segments.

Additional comments to address the testing dilemma in this capacity included:
We have fewer contact hours on the block, and what’s happened is that when I test, it seems as though students are taking longer to take those tests now. Whereas they used to be able to finish in 55 minutes and my tests aren’t any longer, they’re taking now 60-70 minutes to finish a test, so I’m losing time…Maybe that’s poor planning, I don’t know. But it just seems like kids are taking longer because they have the 90-minute block things are stretching out and I’m losing even more time.

I have actually started- and I hate doing this- but if I have a test, the test could be 45-50 minutes, but the test cannot be given at the beginning of the period…because some of them will hold onto it the entire time, and you can’t start new material until everyone is finished. So I will say, “I know you have a test, but I’m going to have to start the chapter right now…and they’ll go, “Oh, no, it will confuse us.” But I say, “I’m sorry, welcome to block schedule.” And I’ll start out teaching something brand new, and say, “OK stopping point, now we have a test.” Totally two unrelated things.

For testing, when you have a chapter or unit test, do you cut them off and do 45 minute tests? I give the exact test I gave on traditional and now they take twice as long to do it. It’s another time lost factor in there, where a test that would take one class period on traditional is taking one on the block.

Not only does this law apply to testing, but to other methods as well.

I also think that activities that should only take 10 minutes…they play around and it takes them 75 more minutes…they drag things out because they know they have all this time left.

Sometimes I think, too, you’re trying to do three activities…I always try to think, I’m going to divide my 90 minutes into 30 minutes…It’s amazing they can extend the activities…there was this lab last week where they had to count out 50 beans and measure them. First they were like, “All 50 of them?” It wasn’t like they were playing around…it really took them forever…I adjusted it…but it was amazing…I don’t know if it’s in their mind that they know they really have this long…or that’s the way they are, it really takes them a long time…I can’t figure it out because it is not always for every activity.
One teacher described how she deals with this problem using more time-management strategies.

You have to put time limits on stuff. I have an egg timer…when this goes off, turn it in.

To summarize, in terms of the instruction and assessment, many teachers reported that they had restructured their curriculum for the block schedule and had implemented new teaching strategies such as a different lecturing style, more cooperative groups, or activities. However, several teachers described these changes as cutting out labs, inquiry-based learning, and the “fun stuff.” Some teachers stated that they had more flexibility to implement different methods within the 90 minutes. The role of testing, especially in AP classes, presented certain problems, both within the 90 minutes and in the course of the year. Parkinson’s Law was also evident in activities ranging from tests to labs. Time management became more necessary and important in minimizing the loss of instruction.
Research Question 4

What were science teachers’ current perceptions, attitudes, and feelings about the block schedule as it relates to instruction, school climate, and time/materials management?

Results of Research Question 4

In this section, the researcher explored teachers’ views on grading and paperwork, types of students on the block schedule, school climate, student absences, class size, planning period, hallway transitions to class, the role of instructional transitions in their lessons, and instructional materials. These items were grouped together because they impact the daily experience of science teachers. Themes that emerged were: Managing Student Paper Work Intensifies With Block Scheduling, Teachers’ Beliefs on Student Success With the Block Schedule Vary Based on the Population Taught, School Climate Influences Teachers’ Experiences With the Block Schedule, Science Teachers Highly Value the Block Planning Period, Planning For Instructional Transitions is a Necessary Skill on the Block Schedule, and The Need for Instructional Materials Increases With Block Instruction.

Managing Student Paper Work Intensifies With Block Scheduling

Because teachers are expected to change the type of activities three or four times per block, teachers may experience an increase in paperwork, depending on what kind of activities teachers are choosing to do. For instance, if four of those
assignments were turned in to be graded, a teacher would easily have four assignments each day multiplied by 90 students, resulting in 360 assignments to grade each night. Due to limited time during the planning period and after school, a teacher may or may not be able to maintain this kind of momentum. In the survey, teachers were asked to respond to the statement, “I spend more time on paperwork on the block schedule than on the traditional 50-minute period.” From the responses, 32% disagreed with this statement, while 29% agreed. Teachers were also asked to respond to the statement, “I assign more work since implementing block scheduling.” The responses indicated that 33% of science teachers disagreed with the statement, while 41% agreed with it. There was no general trend in overall responses in regard to these items on the survey.

From the focus group interviews, some teachers felt very strongly that there was more work involved.

We were told with block scheduling one of the positives about it were the various activities…well you have to grade them. If you don’t look at their work, they are not going to do it. That comes so fast, it just keeps you working all the time. I will tell you…once upon a time, I used to could get everything for the next day, ready in the school, in 30 to 40 minutes. Block scheduling added an hour and a half to my day. It’s just, keeping up with the papers.

Last year with Forensics projects when I had sixty-some kids and three projects each on fingerprinting, hand-writing, and blood spatter, I’m sitting here looking at over 150 projects after four days…there is no way I could accurately grade those. I did the best I could but I’m looking at 200-300 papers that are at least 10 pages each.”
The assignments used to be shorter. They would go home and finish them because it didn’t look so big and you could grade it because they were shorter. Now the assignments are bigger in order to cover all of the material.

Teachers explained that they felt they needed to collect work because otherwise students did not feel accountable, they would not pay attention, or did not want to waste their time on something that was not graded. Teachers also felt guilty not grading assignments when students had taken time to do them. Some teachers stated that it had to do more with the type of students a teacher had in the class. For Academic students especially, if the work was not collected, then they would not do it.

I feel like I have more grading to do, too, on the block schedule, just because I’m doing more activities on block than traditional...I’m collecting more things. I can’t lecture, ask them questions, and be done with class...I have to do something...Academic students won’t do it unless you collect it.

However, with Honors students, there can be a lot of grading simply because they finish the assignments quickly.

That was hard for me when I came here, because in another county, all I had was Academic. When I came here to Wake County, I had Honors and I was overloaded with grading...Honors students finish so quickly, then they sit there and stare at it.

There are some classes that won’t do it if it’s not being graded...but Honors class, they will do an assignment because if they don’t, they are only hurting themselves...there is no way I could possibly grade every day.

Teachers on the A/B schedule mentioned that because they have students all year, they have a lot of grading because they try to work with students who are
in academic trouble in the fourth quarter.

This is what I do. I give them a combination of contract, a list of missing assignments. I said this is what I need you to do. These are the students who would not come in for extra help. I told them if they would go back and do it, I would give them full credit. At the present point, they had not learned anything. If they were willing to do it, I was willing to grade it. They had no hope before. Some of them had 40 assignments. By the end of the year, they went from F to C, with the knowledge they could pass.

Teachers stated that they coped with the amount of paperwork and grading in different ways. Some teachers said they graded for completion, or had students turn in some work instead of turning in everything, and some grading was done as a class as teachers reviewed the answers. In addition, from the open-ended surveys questions, the top activity teachers reported spending their planning period doing was grading.

Answers from the open-ended survey responses also varied when teachers were asked to respond to the question, “What is your current opinion of block scheduling as it relates to instruction?” Thirty-five percent of the teachers felt their instructional practices had remained the same. While most statements were generally positive such as “good” or “better,” specific reasons listed included the following: instruction had improved due to time to complete labs, it forced them to become more efficient with time, the allowance for more creativity, varying their instructional strategies, and “less down time.” On the other hand, 42% felt that instruction had worsened for other reasons including: faster pace for students, loss of processing time for students, reduced time for covering material, student
absences, time within a day is too long to maintain student interest, and difficulty for EOC courses. The remaining negative responses were general statements such as, “I hate it.” Some teachers felt it was good for teachers but not for students, while other teachers responded that it depended on the type of student. A few teachers left this question blank.

Teachers’ Beliefs on Student Success With the Block Schedule Vary Based on the Student Population Taught

This theme emerged based on comments which suggested that not only does the teacher’s experience change on block with the type student one teaches, but also with the amount of success that the teacher experiences with those types of students. For instance, the teacher’s block experience varies depending on whether a teacher has special populations of students, including special education and English as a Second Language (ESL), Academic or Honors students, underclassmen (especially freshmen) or upperclassmen, or Advanced Placement (AP) students. The following sections highlight these issues for teachers.

Special populations of students.

Teachers had mixed feelings about special education students on the block schedule. On the one hand, teachers felt as though these students struggle because they get behind and are disruptive because they feel they will not pass the course. Another reason is the length of time they take to complete assignments, especially in inclusion classrooms. Also, their attention span and distractions
resulting from many instructional transitions may be problematic. Finally, the lack of time hinders the time a teacher has for 1:1 assistance.

The problem was that it was supposed to help lower kids be able to restart and graduate on time and the truth is lower kids struggle. They don’t do homework at home, they don’t know how to study, and they cannot retain the amount of information that I go over in an hour and a half. So…If they don’t understand Monday, then Tuesday they’re lost, by Wednesday they’re throwing things. It’s not helping them at all…because they feel completely overwhelmed and I’ve heard a lot of kids say, “There’s no way I’m passing Biology.” They’ll take it two, three, four times…and they’ll eventually pass somehow…but if they think they can’t do it then they’re not even trying. They’re not even starting the process.

For a PALS [Peer Assisted Learning Strategies] class, it is not easy for them. I think they still have a hard time on block scheduling. I notice they take longer to do things. It’s hard to teach on their level when they are mixed with Academic students…and finishing at different rates…

To keep their attention, you have to change things but at the same time when you do, it’s too many distractions. It’s frustrating to deal with that…I think the better students will sometimes feel that sense of urgency, but the lower level kids don’t care. Even down to the end, the teachers feel it, but the kids don’t.

Some students just can’t [handle the pace], like ESL kids, or low kids…and that’s a disservice to them because I don’t have time to help them. They are responsible for the same material and test as everyone else. On block scheduling, you just don’t have time to spend with the kids who are ESL.

For some teachers, testing modifications are also problematic.

After we test, we move on to the next topic. I try to do things to start the next group because you have a room full of testing modifications. We have a 45 minute window for testing and then something else for the next unit. I try to time those out but you either have to over-test them or wait for students with modifications.
Another issue for teachers was that, for those students on the block, they only get Curriculum Assistance (CA) class for one semester if they want to acquire their credits to graduate within four years.

Some of the special education students run into trouble with having Curriculum Assistance. Before they would have one CA class and five courses. Now they may have to take it both semesters…it eats up two classes if they need this resource all year…or they get it one semester and not the other…so this is a disadvantage.

On the other hand, in some cases teachers felt that the block schedule helped special education students be more successful.

It’s great for the autistic students…for some of them…because they actually get stuck on problems…once they get on it, they are happy to figure it out…but they have to have the high interest. If they don’t have that high interest, then it is an uphill battle the whole way.

If you have kids with special needs, you have more time to deal with them…if you are trying to do 1:1 things with students in a 50-minute period, how many kids do you get to, versus a 90-minute period? There is a benefit for lower level students as well.

**Academic and honors students.**

For Academic and Honors students, the block schedule also highlighted differences in teachers’ experiences. For Academic students, teachers cited that they tend to get bored more easily, want to be entertained, are hard to keep focused, would not do their work unless collected, and did not do their homework.
I think it is just a boredom factor…especially with the Academic kids. You can only do without going completely crazy *so much* in one class period…you can plan 35 activities to keep them occupied, but who has time to set them up? So when they are doing book or group work, they find something to keep themselves occupied…they throw a pencil or a chair to keep themselves occupied.

So we feel like we should build time into our class so they can do their homework because that’s the only time they will do their homework…and that is more time taken out of the day…when you do build that time in, they don’t do it. I’m like a babysitter spending my days running around trying to make everyone do it…and I’m exhausted.

I think it’s tough on the lower level students’ attention spans…they are almost pre-programmed, every 15 minutes, they want a commercial. With 90 minutes, there are a lot of commercials you have to fit in there.

Some teachers mentioned differences in organizational skills and commitments outside of school, or lack of resources at home as additional reasons these students are not successful on the block schedule. Often they do not have the transportation necessary to stay for review sessions nor parents who can help at home. This problem can be magnified on the block schedule because the pace is quicker and assignments in each class are more intense. Not understanding a topic or completing homework for one day on the block schedule is like two days on the traditional schedule. The typical pace of a textbook with 30 chapters would be one chapter every three days. Weekly tests are common.
There are a lot of circumstances, too, that we sometimes forget about or don’t want to think about… I have kids who are taking care of siblings and the tons of kids they have at their house, because as soon as they get home, the sister or the mom go to their job. I’ve had kids where I’ve tried to get them to do their homework and they say, “I don’t know how to do it.” Or “I can’t do it when I’m taking care of these other kids.” It doesn’t allow for any freedom like that because there is no way they can get their work done that we need them to get done to be prepared for the next day.

In theory it should be better for the students…but I don’t see it in practice yet, that it’s better for the students. They have to deal with eight classes, but they don’t know how to deal with it. The low-level kids… how could they organize their time?

Due to time lost on the block schedule, there is often not a lot of time for review and re-teaching. Academic students are at an additional loss if they do not understand concepts the first time.

At the same time on an Academic level, you may cover one topic every single day and they say, I didn’t get it the first time… you might need two or three days… you can’t review… a lot of them feel very overwhelmed… if they are not on top of it… a lot of them really struggle with that… it’s the Academic kids that need to come in after school for help…

For the kids, I think it’s horrible. It’s too much, too fast and it’s not working. If we are supposed to be teachers looking out for the best interest of the kids… that’s not what we’re doing.

Teachers felt that Honors students, on the other hand, fare better on the block schedule. With the block schedule, Honors students tend to work through assignments faster, can afford to get the teacher off-topic more with good questions, and have an opportunity to take more classes and boost their GPA’s. They receive good preparation for the college experience, and are more successful overall.
Our higher-achieving kids like the block schedule because now they have eight blocks. They can boost their GPA by taking all these classes.

I think it is more suitable for the advanced, gifted, self-motivated, self-directed, the ones that love to study on their own…those kind of students just really soar on the block schedule.

**Upperclassmen versus freshmen.**

However, while the block may be better for upperclassmen in terms of college preparation, some teachers felt that with the freshman transition to high school, the intensity of the block schedule can be difficult. Some teachers attributed this to maturity and stability. One teacher commented that freshmen need a lot of structure to stay focused on the block schedule. Mixed grade level classes with freshmen can also be difficult as a result of not being able to meet all students’ needs.

For the juniors and seniors, it is preparing them for college really…they are going to get sick in college, miss class, and will have to deal with this. For ninth and tenth graders, the block is not good. They need to be learning those skills, while at the same time, they need more hand-holding.

Freshmen are really getting behind in Honors Earth Science. This is the most diverse group I’ve ever had. Last year I had 28 freshmen. I slowed it to the freshmen pace. This time, I have 17 non-freshmen, 12 freshmen and we are going chop-chop-chop…the freshmen have the “deer in the headlights” look.

And the young kids just don’t have the maturity or stability to stay and focus for 90 minutes on one topic…they need to switch.

Still, some teachers felt that the block schedule was beneficial to ninth grade students because of only having four classes.
I’ve been a part of two ninth grade academies. For ninth grade, I actually think the four-period day is good for them…

In addition, teachers were asked to respond to the statement, “Students are more successful on the block schedule.” For this item, 35% of the teachers disagreed, while 21% agreed with the statement. Also, when teachers were asked to rank the statement, “I have difficulty maintaining student interest on the block schedule,” 35% of teachers disagreed with this statement, while 55% agreed with it. From the focus group interviews, it appeared that much had to do with the type of student being taught: special education, Academic, Honors, AP, freshmen, upperclassmen, etc. Because teachers tie their success to student success, teachers’ experiences with the block schedule depend on the type of student being taught.

**School Climate Influences Teachers’ Experiences With the Block Schedule**

School climate is based on whether teachers feel their work place has a conducive environment for teaching and learning. Factors that affect school climate include those issues which may interfere with the consistency of lessons, interruptions, the ability to work with students, staff morale, etc. Included in this particular section are the impact of absences, class size, and hallway transitions to classes on teachers’ experiences with the block schedule.
Absences.

In terms of absences, some teachers believed one negative of the block schedule was maintaining instructional consistency.

I dislike it tremendously. A lot of it has to do with the level of students…it’s very difficult to get consistent attendance, even if you did have five separate lessons with five different activities, five different approaches…it’s very difficult to have them come in and complete assignments.

In a lot of cases, students who tend to get behind anyway get behind worse on the block…the units come and go so quickly…if they miss a couple days it could be half a unit.

My biggest one is 90 minutes is a long time for kids in one class…so I think it’s difficult for their attention spans. Attendance is a problem…suspensions. If kids get suspended for 5-10 days, they miss a unit. When they miss a week, there is no way to make it up.

When you start losing kids on block schedule it is of so much significance because it is so much time that you’re losing. It seems like to me, the kids that are missing are the kids that really need to be in class every minute that they can be in class…and they will be out for valid reasons. They have to take the Competency test, or the Computer Skills test or whatever it is…

If they are out for a week sick…some of them come back…It can be October, but they already feel like they failed…it doesn’t matter what they do next quarter.

In addition, absences are hard on the teachers because it means more work for teachers to catch students up.

It’s also harder to get kids caught up…it’s a nightmare…if they miss a week they just missed two weeks on traditional schedule.

If they are there, there is time to teach. The re-teaching is the issue…
Absences, both student and teacher, can have a huge impact. If they are out for a week, that is two weeks in a traditional year. The substitute is never as good as a regular teacher. When students are out, they have to be conscientious about what they missed.

It’s a nightmare for me to be absent and substitutes may not carry through. This end of year is also non-stop with assemblies, absences, field trips… traditional days were more forgiving. On traditional, I wouldn’t mind giving up 10 out of 180 days.

Concern about absences was also expressed from the open-ended survey questions.

Absence… is a major concern because of the pacing. It’s rare that I will go two days without a graded assignment. If some kid gets sick for a week, they have so much make-up work to do in every class. That becomes a nightmare for them.

To summarize, absences can be more problematic for both students and teachers with the block schedule due to loss in overall time.

**Class size.**

One issue with which teachers felt deceived was expecting a lower class size with the block schedule. With larger class sizes, teachers cited safety issues and less 1:1 time, and consequently, less personalization.

One of the pushes with block schedule I always heard was your classes would be smaller…I would like them to come and see the 32 Chemistry students that I have in third block all crammed in one room with burners.

In Chemistry, I have 34 in one class…

It’s not only dangerous; it takes more time [to get around to the students].
In the new classroom style, the new buildings…they made all of the classroom stations against the wall…so the kids’ backs are to you. [When students’ backs are to the teacher, this makes the classroom environment more stressful due to safety issues and not being able to see what students are doing.] You can’t even see if they’re burning something. You’ve got 32 students doing something and you can’t really see what they’re doing. It makes it more difficult to do the labs.

**Hall transitions.**

When teachers were asked about school climate in terms of hallway transition time, their responses were varied.

It helps the administrators because they only deal with three changes, but hurts the teachers.

I think they *need* to get up and walk to a different class every hour…

However, some teachers also cited fewer class changes as a positive.

I also like the block because the change time in-between classes is huge. I remember some days on the six-period schedule…I was at one school and they have eight classes…I’d feel like Pavlov’s dog some days with ringing of the bells. With four classes, it’s less hectic in the halls; it’s less hectic in school in general.

With four periods versus six, there is less transition time that could add back to class time.

But you tend to cover more on the block…even though you’re missing the hours…when I went from the year-long to the block in the same day, I felt that it took me three periods of traditional class to cover one period of block class, just because of the time wasted by getting in the room, getting the roll taken…the little stupid stuff you have to do every period.

I think in a school this large, as full as our hallways are…it *reduces* the chance for conflict.
In addition to the interview data, there were open-ended responses on the survey regarding school climate with the block schedule. Overall from the survey data, teacher responses varied. Many statements made regarding school climate were generally one or a few words. From the results, there were 26% positive responses, 30% neutral responses, 21% negative responses, and 16% of the science teachers left this question blank. Specific positive statements made about the school climate included: fewer students in the hallway because of fewer transitions, decreased noise levels, more time to build relationships with students, longer planning periods, the “fresh start” with having two semesters, the flow of the lesson is easier, less tardies due to taking less classes, students are taking fewer classes. Examples of neutral responses were: “OK,” “No opinion,” and “No change.” Finally, reasons listed for why a classroom climate might be negative on the block schedule included the following: increased stress, frustration with time, difficulty in teaching during spring semester with fewer calendar days [so perhaps this meant the classroom was more stressful due to pacing], failure of the schedule to promote student success, student retention of material, increased pressure to “do more with less,” students getting bored more quickly, students roaming the halls, lower morale, changes in of classroom rosters, do not get to know the students well, students not putting in effort, students not working at the pace they should, a lack in the depth of knowledge
overall, teachers feeling rushed, teachers being tired and worn out having to teach 180 kids versus 120 students in a year, and more discipline problems.

**Science Teachers Highly Value the Block Planning Period**

When teachers were asked how they used their 90-minute planning period, there were various responses. From the survey responses, 80% stated time was spent planning for classes; 71% also listed grading. The third-highest activity mentioned was lab preparation or cleaning up labs (29%), followed by e-mails (25%). Additional activities included the following: attending IEP meetings, covering classes, maintaining their Blackboard webpage, using the restroom, professional development, making copies, sports prep/club activities, running errands around the building, gathering make-up work for absent students, contacting parents, tutoring students, writing referrals, collaborating with other teachers, mentoring beginning teachers, viewing videos, and department chair duties. Less than 1% of the surveys mentioned teachers having time to relax.

Many teachers listed the 90-minute planning period as positive, stating they have time to grade and plan lessons for students.

You can get something accomplished…sometimes two things.

I also like the 90-minute planning period…grading, e-mail, lesson plans

I also like more time to develop labs and lessons.

Teachers on the A/B schedule also felt that planning was a positive, since they could have plans for one type of class for two days.
We have more students, but we have some flexibility…two days to plan and two days to grade.

However, despite having a longer planning period, some teachers mentioned that their time was not really their own. Instead, they spent their planning period on other things such as covering classes or parent conferences. Planning time was also taken for Professional Learning Communities, staff development, and IEP meetings.

From the survey data, when asked to respond to the statement, “I spend more time planning for classes with block scheduling,” 26% of teachers disagreed with this statement, while 49% of science teachers agreed with it. When asked to respond to the statement, “I find it difficult to plan for 90 minutes compared to planning for 50 minutes, 51% of the teachers disagreed with this statement, while 27% of teachers agreed with it. From the survey data open-ended responses, one teacher also stated:

I work the entire time and usually 2-4 hours after school just to keep up! There is so much work to do! I grade, run off papers, set up labs, clean up from labs, write tests, etc.!

Planning For Instructional Transitions is a Necessary Skill on the Block Schedule

Another planning issue teachers felt was important was the role of transitions. Teachers recognized that with the need to use multiple instructional strategies came the need to transition well from activity to activity.
I also think lots of activities…lots of variation…but I also think it is important that you transition well…otherwise you are going to lose time.

That’s the key is the transitions…The block difference is the transitions. You have to switch what you are doing every 20 minutes.

One more problem that I have with block is that is where I am seeing a loss of time. I didn’t feel a twinge of guilt if I talked for 30 minutes on traditional and worried about other stuff the other 15 minutes. If I have to do 60 minutes straight here, I am losing students. I am forcing transitions. Maybe I am not that good at it. I don’t see them as effective as they could or should be. I see it as a waste of instructional time because their attention is not there. I can’t push anymore on them.

I just changed more in my pre-planning…after three to four years of planning on traditional, I was more knowledgeable and could be loose. If I had some extra time, I could elaborate…On block schedule, I’m very exact. Here’s my exact transitions…here’s what I need to do on certain days…

The Need for Instructional Materials Increases With Block Instruction

As teachers with the block schedule increase their student load for the year (compared to the traditional schedule), more materials are needed because of the increase in the number of students a teacher is teaching, in addition to the increase in frequency for which the items are being used. From the open-ended responses, when teachers were asked to respond about having enough materials on the block, their answers again ranged from positive (28% surveys) to neutral (40%) to negative (24% surveys). For the remaining surveys, 8% of teachers left this question blank. Positive response examples were: “Good,” “Materials are available,” and “Wonderful.” Examples of neutral statements were “No real opinion,” “No change,” and “No difference.” Reasons listed for not having
adequate materials included shortages of: copies/paper, lab materials, and books. Teachers also noted that since there are now 180 students with the block schedule, instead of 120 students on the traditional schedule, materials are used up twice as fast and therefore more are needed to fulfill the expectation that more activities be done on the block schedule.

From the Likert-type items on the survey, when asked to respond to the statement, “I do not have adequate instructional materials to teach on the block schedule,” 64% disagreed with this statement, while 22% agreed. In addition, when asked to respond to the statement, “I have adequate laboratory materials to teach on the block schedule,” 23% disagreed with this statement, while 68% agreed with it. Interesting comments brought up through the interviews included the following:

The equipment gets more use and you can’t afford to replace it on a year-by-year basis…every five years you should be able to order new equipment like new books.

We have more students and every year we get less money to order the supplies. More students, less money, less labs…it doesn’t have to do with the time, but it does have to do with block scheduling. If you’re going to give me 30+ more students, then give me money to cover the supplies. They don’t take into account that all the companies are going to raise their prices, too. We have the same amount of money, more kids, less stuff.

The only thing I find is an issue is if you have two teachers who are at the exact same spot and the exact same lab, there is not enough equipment for three periods. That is just planning with your fellow teachers. It rarely happens, but when it does, we adjust.
Books.

One issue that arose on the A/B Schedule only was the need for more books. Since students are taking all eight classes at the same time, more books were needed compared to the previous six-period schedules.

Once we realized we needed more than six periods a year, for the students to get the things in that they needed, we felt that the A/B block was the lesser evil, as opposed to 4X4. We wanted to be different than other schools as well. We felt like more people were willing to try the A/B schedule. I also remember foolishly thinking that our classes would be smaller. It turned out that they weren’t. We also forgot there were two more classes they had to sign up for. Some of us now have 150 kids… while others solidly have 180. We connected the dots later.

That kind of blind-sided us. I don’t know why we didn’t think of that. Some teachers have huge issues with loads. We also didn’t realize the book issue and we did not get funding for extra books. It’s hurting us badly from that standpoint.

Not having books may also influence the type of instruction teachers use.

For me, I have to give them homework time because books are an issue.

From the survey results, in terms of time, reactions were mixed. Some teachers felt that they had enough time with the block schedule (30%). On the other hand, 38% of teachers felt they did not have enough time overall. Of the remaining surveys, 21% teachers responded neutrally, while 11% of teachers left this question blank. Specific reasons listed for teachers responding positively were: more planning time, time to do labs, more efficient use of time, and feeling that students are more prepared for the college schedule. Examples of neutral responses were: “It has both advantages and disadvantages,” “No opinion,” and
“OK.” Finally, reasons for negative feelings on the issue of time included: insufficient time overall, feeling rushed to cover the curriculum, and 90-minute periods being difficult to focus student attention.

To summarize, teachers appeared to be divided in agreement in terms of whether they had more grading and paperwork on the block schedule. Some teachers felt that classes with Academic students had more paperwork because these students refused to do non-graded work. On the other hand, teachers of Honors classes reported that Honors students produced more work to grade because they finished assignments more quickly than Academic students. To alleviate the grading, teachers used strategies of grading for completion, grading only some assignments, and reviewing work in class.

When teachers were asked their opinions on student success with the block schedule, responses varied depending on the type of student taught. Many thought that Honors and AP students were doing well with the block schedule. However, some teachers felt that Academic students struggled due to not completing homework, retention of material, special education needs, resource issues, and maintaining student attention with the longer blocks of time. Some teachers thought that the traditional schedule was better for Academic students because they received year-long instruction in smaller daily increments.

In addition, the teacher experience also varied with the grade level with which one was teaching. Courses with upperclassmen tended to fare better than
those with freshmen since freshmen have lower maturity levels and they are experiencing the transition into high school. Also, in regard to school climate, some teachers indicated that they had lower absenteeism, and for students, being absent could be more detrimental when compared to the traditional schedule. Many teachers were surprised that their class sizes were not lower after moving to the block schedule.

With time and materials management, the A/B schedule tended to be more problematic with books, since 180 students needed books all at the same time. In addition, teachers stated that their planning period was spent mostly grading and planning. The third-highest activity during their planning period was preparing for or cleaning up labs. Many teachers felt the 90-minute planning period was very positive, as they thought they were more productive with their time compared to the previous 50-minute schedule. Teachers also recognized the need for restructuring their lessons and to build in more transitions. Finally, for instructional materials, reactions were mixed. Some teachers pointed out that teachers have two sets of students and are going through the curriculum twice in a year. In addition, with block scheduling accompanies the need to do more hands-on activities, which also require more money designated for materials.
Research Question 5

What were science teachers’ perceived benefits and losses in changing to the block schedule?

Results of Research Question 5

In this section, topics were organized by ongoing or overarching issues that may affect teachers’ block experience. Topics in this section include how Wake county science teachers respond to the North Carolina Standard Course of Study (NCSCoS) on the block schedule, the impact of pace for the student processing of material taught, how this information is retained, teachers’ relationships with students in the classroom, and unique advantages with different block schedule plans, such as the fresh start of a new semester with the 4X4 block. Themes that emerged were: (1) The North Carolina Curricula and Pacing are Problematic for Many Block Science Teachers, (2) Processing Time and Retention of Material are Hindered With the Block Schedule, (3) Students do not Appear to Feel the Same Sense of Urgency Teachers do With the Block Schedule, (4) Teachers’ Relationships With Students May be More Fleeting With the Block Schedule, and (5) 4X4 Block Teachers Appreciate the Fresh Start of the Semester Schedule.
North Carolina Curricula and Pacing are Problematic for Many Block Science Teachers

In this section, teachers voiced opinions about the North Carolina Standard Course of Study and its effectiveness in matching up to the block schedule time frame. On the survey, when teachers were asked to respond to the statement, “I find it difficult to teach the Standard Course of Study in the allocated time,” 35% of teachers disagreed with this statement, while 61% agreed with it. From the interviews, some teachers echoed these sentiments. However, from the interviews, the courses mentioned most often were AP courses, followed by the Biology and Chemistry curricula.

AP Biology and AP Chemistry ask you to cover two semesters of college Chemistry or Biology in 90 days of high school. So I figured it out you actually have eight hours of face time a week in college and nine hours of face time on the block—we had more in face-to-face time, but less time for them to “get it” and to incorporate it in and “learn it.”

Four days of plants in Biology.

One of the teachers I know who has taught Biology and Physical Science for years who says teaching Physical Science on the block is doable and she had enough time for the content—it’s absolutely impossible to cover the Biology content on the block.

I think the Chemistry curriculum is good as far as connecting to college. The kids come back and say, “Guys, it the same thing you had in high school…it’s so easy.” It’s really a good curriculum—but we don’t have time to do it justice.

When teachers were asked to respond to the statement, “Instructional pacing is easier on block scheduling compared to the 50-minute period,” 39%
disagreed with the statement, while 29% agreed with it. Interview statements made included the following:

It’s almost a whole quarter, one-third less...fourth quarter is essentially gone. I have students who didn’t do well in the first quarter...Biology builds on itself...they really didn’t get it the first quarter so now in the second part of the semester, they are overwhelmed and I can’t get them caught up at this point...it’s so fast.

It seems like you’re always told to open each topic, go through the topic, close the topic, go back and assess. Coming off of National Boards, they want you to seem like that’s like everything you do...and it’s so not. On the block schedule, if you did that for each topic...you would never get done. It’s so contradictory. They want us to teach like this, but give us this amount of time to do it. While it’s great on a day-to-day basis, it’s ridiculous trying to get through it without leaving anyone behind.

I taught traditional schedule for a year. One of the bonuses of it was with the lower-level kids, you could go slower. You could go at a slower pace. You didn’t have to cover as much material. They weren’t as responsible for as much...you could give a homework assignment for a little bit, where they weren’t as responsible as much...not a whole chapter.

From the open-ended response questions, teachers also stated:

The material is too extensive and too complex for students to grasp overnight. If you slow the pace, then you cannot cover curriculum.

When teachers were asked to respond to the statement, “I worry I have too much material to present with the block schedule,” 28% of the teachers disagreed with the statement, while 60% agreed with it. One teacher commented as follows:

Well I think that when you go to the block, you lose that time. There’s just a lot more pressure on EOC teachers to become more focused on those objectives. It just eliminates teaching things that are not in the curriculum, whether we like those or not...and you end up covering things probably faster than you would like to.
In addition, when teachers were asked to rank the statement, “The state curriculum needs to be revised to accommodate block schedules,” 18% of teachers disagreed with this statement, while 64% of teachers agreed with it.

Comments made during the interviews included the following:

For the operation of the school, I think the 4X4 block is better. For the operation of the kids and student body, I don’t…unless the curriculum is changed to be able to appropriately address the Standard Course of Study in the amount of time given.

I was very disappointed when they went to the block schedule, that they did not revise the Biology curriculum to fit the block. It’s an inch deep and 20 miles wide. They really needed to do what some of the other states did like Pennsylvania and Minnesota did, and revise it so that it is more doable under these circumstances…I realize the whole state is not on block, but it seems to be a problem.

The curriculum that’s set up now is a broad curriculum, which is good for 45 minute days. You could do a new topic every day…but a 4X4 block, a 90-minute period is not set up for a broad curriculum. It’s set up for a deep curriculum. Again you’re doing one topic a day to explore and investigate it in depth. You can’t do the 45-minute curriculum in a 90-minute block. You can’t just change the schedule without changing the curriculum.

From the open-ended survey responses, one teacher added:

It’s very fast and there is a lot more pressure on the kids – less room to make mistakes. The curriculum must be compacted.
Processing Time and Retention of Material are Hindered With the Block Schedule

Many teachers mentioned concerns about the pacing of the block affecting students’ ability to retain information. Because the curriculum must be taught in 90 days, if students do not learn in the allotted time, or spend time on their own with the material, they may not have enough daily time to master the material.

What you read about in education is you spread it out, add a little bit of practice everyday, over a longer period, instead of all at once.

Chemistry needs processing time…Algebra II needs processing time. I tutor a student who is on traditional schedule…so it’s very interesting to see my students struggle with the math classes versus this student. My students go through a chapter a week whereas she will go through two sections a week.

That is the student population who I see the block is hardest for. The kids who are not getting it are the kids who are not here. They don’t have the time they need for processing it. They have such a defeatist attitude; if they don’t get it the first time, they won’t try anymore. They shut down early in the semester and really struggle. For some, they start to show progress toward the end of the semester but by then it is far too late. They can’t make up a whole semester in the last week.

…from a student standpoint, I don’t think there is enough processing time…and students need that processing time to learn the material. Trying to cram it in in a semester makes it very rough for these kids, even though they only have four courses they have to deal…But I hear though results that say there is no significant difference in student achievement in the scores between block and non-block…but I guess I ask the question, “Why are some school systems going back away from the block?”

In some ways, the A/B block might be advantageous to regain some daily processing time, since students meet every other day all year.
I like the fact they have every other day to process the information.

I like the A/B day over 4X4 because of the processing time to learn math and science.

Consequently, teachers on the 4X4 block may have to work harder to build that processing time into their instruction. Many teachers may also try to regain some of this processing time through review sessions before their final exams; however, they have stated these are not always helpful. Other teachers mentioned that there is no time to review with the block schedule.

In all honesty, one review session doesn’t help. You can’t review a whole year in two afternoon sessions…and they don’t remember what they learned the night before without looking at it.

Or they remember the concept, but you have to get completely into the review before they say, “Oh yeah, we did go over that.

I don’t review in Physics…

My Chemistry students almost passed out the other day when I said, “We don’t review exams in Chemistry. We don’t have a review. We will teach new material up to the last minute.” They went <gasp> and I said, “Here are your review packets…review on your own.

This lack of retention of material becomes problematic later in the upper levels, when students take AP classes and seem to remember very little material.
When they get to my advanced classes, they often tell me they cannot remember *a thing* that they learned in their basic Biology classes…it disturbs me that some of these things I *know* they learned…they say “We learned that just for the test, and I don’t remember any of it”…and I *know* these teachers worked *really really* hard to teach that stuff and it didn’t stick with them at all.  It is not like these are the obscure topics, either…these are the major topics…major, big things…they don’t remember *at all*…it’s two years after they’ve had Biology and it’s gone…

Teaching Chemistry, I would want to go back [to the traditional schedule].  It hurts me in the long run when I teach AP Chemistry because of enrollment and the kids who are there are not as well prepared.

One positive aspect teachers recognized about retention on the 4X4 block schedule was that students can repeat a course within that year if they do not master the material the first time.  Also, there are advantages to having four classes per semester on the 4X4 block schedule.

It gives kids a chance to make up a course as opposed to summer school.  If they fail one semester, they take it again.

It’s good for the kids, too, having three to four classes versus seven or eight classes a night.

**Students do not Appear to Feel the Same Sense of Urgency Teachers Do**

**With the Block Schedule**

With the block schedule, some teachers felt that their time spent teaching became more important, but the students were not at the same level of urgency to learn the material.  This often resulted in a tug-of-war with teachers wanting to move the students along, and students tending to go at their own pace.  Reasons ranged from student attention span to a lack of student accountability.
Especially for freshmen…I don’t think the kids will ever feel the urgency that we do…because Johnny who sleeps through…class’s name…does not go next to that test score. I will always feel pressure when it comes to that…and they could give a hoot less, when their name does not go next to it.

I understand that you need that mental break, but unfortunately, you just don’t have that time to give them…and I also think on block scheduling it puts a lot more responsibility on the student, and I don’t know if they recognize that, but in order for us to get it done, we could, if they would come to class prepared. If I ask you to read section one, I could probably get it done in 10 minutes…but you don’t read it so now takes me 45 minutes to go through it because there’s no background. And I don’t think that they really understand that it does put more responsibility in their lap to come prepared.

There is a sense of urgency only when report card time comes.

The attitudes of the kids…with kids being kids, this time of the year, they are starting to pack it in mentally…they shut down. In a traditional school year, they would do this a week before tests. On block, if they do this, this is a big deal, and they do this twice a year.

Especially when the county did that thing with Biology last year…when they did a survey for the teachers who had taught Biology for three years…when they came in, observed them, and ranked them…that just makes a lot of urgency…puts everything on you. Where is the student accountability?

From the survey, teachers were asked to respond to the statement, “My stress level has increased since changing to the block schedule.” In their responses, 31% of teachers disagreed with this statement, while 31% of teachers agreed with it.
Teachers’ Relationships With Students May be More Fleeting With the Block Schedule

With literature review focused on the improvement of student relationships with the block schedule, this issue was important to explore. Before the block schedule, from the survey data, science teachers in Wake County reported that they had an average of 132 students per day. After the block schedule, teachers stated that they had 87 students per day. When asked to rank the statement, “The student-to-teacher ratio has increased in one or more classes on block scheduling,” 23% disagreed with this statement, while 42% of science teachers agreed. In terms of the block schedule promoting better student-teacher relationships, reactions were mixed. Some teachers felt the block schedule was detrimental.

One thing I miss is I don’t know my students as well after they take my class. I forget their names after a semester or two. I know I had them, but I can’t remember their names, whereas I could on traditional schedule. I could remember kids on traditional schedule from a decade ago when I see them in the community.

You get to know their in-class behavior quicker because you are with them for 90 minutes, but long-term…unless you know them outside of class or outside the school environment, I don’t see that happening.

On the A/B schedule, additional initial challenges arise because teachers see students every other day rather than every day.

It takes me longer to learn their names…especially when you don’t see them but every other day. I used to know them all by the end of the week on traditional.
Two teachers also pointed out they missed seeing students grow throughout the year.

The thing I liked about the traditional schedule was I really felt like I had time to get to know my kids. On block, I really feel like I had time to get to know my kids just two weeks ago, now at the end of the semester. On traditional schedule, I could spend some good time getting to know my kids, their parents, and the kids’ struggles by Christmas. By the second half of the year, I could tailor lessons to their needs. This way, it takes four months to get to know them…then they leave. You miss that personal reward.

I don’t get to see improvement in students. Improvement generally takes a long time. A half a year is just not enough time, especially considering maturity.

From the open-ended response questions, teachers responded:

I can’t remember the names of my students a year or two later (or what grade they are in) although I can remember my students’ names from many years ago. Less face time equals less of an impact I am having on my students.

I find it more difficult to remember students when they ask for recommendations for college.

However, not all teachers felt the block schedule was harmful for student-teacher relationships:

You do have more time to do the lab…more time to interact with the kids…

The 90-minute class period allows for flexibility, to go over equations and formulas…you can work with every student individually. In 90 minutes, you can model it, help students, stand over the kids and get that done while other kids do an independent assignment.

One major advantages teachers noted over the A/B schedule over the 4X4 schedule was that teachers felt they worked more with students over the long
term. Whereas teachers on the 4X4 schedule get new students at the end of each semester, A/B teachers have the same students for entire year. For students who struggle, A/B teachers felt they “contracted” more with students to improve their grades.

This year, when we got to the end and there were a number of kids in trouble. I said, I’m going to give you some new work and I’ll change this to a seven instead of a zero. One mother e-mailed me and said the exam was too hard. I told her I gave her son an opportunity to make up some zeros and he didn’t take the opportunity.

I have a feeling we have a tendency to work with kids more, as opposed to saying we are done with them in January. I think that restart classes are educationally unsound. We have a tendency to work with kids more with our schedule. We want to get them through it.

From the survey data, when teachers were asked to respond to the statement, “Under block scheduling I have more time for students,” 34% disagreed with the statement, while 41% agreed. Finally, in terms of discipline problems, teachers were asked to rank the statement, “There have been more discipline problems in my classes since changing to block scheduling,” 39% of teachers disagreed, while 22% agreed. Two comments from the interviews had to do with maintaining student focus on the block schedule, which can lead to discipline problems:

The only negative I have is student focus. You have to get them out of their seat or they lose it after 20 minutes.

I have more discipline issues because students have less ability to focus on their work. They are more distracted. It’s like they want commercial breaks like on TV.
4 X 4 Block Teachers Appreciate the Fresh Start of the Semester Schedule

While A/B-scheduled teachers mentioned that they liked their schedule because they have their students for the entire year, some 4X4- scheduled teachers tended to be equally happy getting a fresh start, or new batch of students every semester.

I also do like the change in students at the end of the semester, getting a break from kids I do not want to have anymore, and then I can meet new kids. I change what I teach from fall to spring semester so I can regroup and learn new things also.

The other thing we have said with block versus a six-period of day, you don’t have that big period of time where kids know that they are burned for the year and won’t do a thing…when I taught on a six-period day, they would get three report cards and you have an entire nine weeks with kids who knew they were burned. I love the fact that with the block, it starts over…especially with our freshmen. The come in, they get off to a rough start…they get a fresh start for the next semester.

This sentiment was also echoed in the open-ended survey questions:

Problem students are only problems for five, months rather than 10 months.

Another advantage cited by teachers was that, with the 4X4 block schedule, students can graduate earlier and take college classes sooner.

However, one disadvantage pointed out by a teacher on the A/B schedule was that re-teaching material to new students could be cumbersome.

One of the things with Biology…I like it at the end of the year when they know how to write a lab report. In January, we don’t have to re-teach this to a new group.
In the open-ended response questions, teachers were asked to summarize their experience with what was working well (benefits) and what was not working well (drawbacks) of the block schedule. The benefits listed included the following: more time for lab work (60% of the surveys), followed by more time for varied activities and assessments (15%), fewer students at a time (12%), more time within a period to expand on a topic (10%), longer planning period (8%), student change over/fresh start (7%), reduced preparations (7%), and better student relationships (6%). Some surveys also mentioned having fewer papers to grade, feeling time pass quickly, exposing students to a schedule similar to a college experience, having more collaboration time with peers, and being forced to become more efficient with time. Three surveys were left blank for this question.

In terms of the drawbacks of the block schedule, teachers listed: the pace being too fast or too much material to cover (39%), students’ low attention span (specific to freshmen, ESL, and special education students), (20%), students’ retention of the material (9%), student and teacher absences (9%), and having to leave out fun/enrichment activities (6%). To a lesser extent, teachers also mentioned additional issues: some curriculum not fitting well with the block schedule, reduced lab time overall, less time for practice, lack of student urgency/students wasting time, more discipline problems, having insufficient activities to vary teaching, time management/transitions, more preparations on the
A/B schedule, too many students with the A/B schedule, lack of resources with the A/B schedule, more paperwork with the A/B schedule, and having to repeat the same curriculum twice in the year. Other negatives on the survey included: larger class sizes, teaching three preparations in a semester, calendar issues, having insufficient money for labs and field trips, resources running out twice as fast, more coverage of classes, less time to get to know the students, and more grading. Five surveys explicitly stated that there were no disadvantages and eight surveys were left blank.

To summarize, many teachers felt that the state’s standard course of study was designed for a broad overview of content, while the block schedule was built for fewer topics covering more depth. This dichotomy creates stress for teachers when they are unable to teach the entire course of study in 90 days, especially considering student constraints such as the ability to retain and process material. For this particular situation, the A/B schedule may be preferred so that students have more time to learn the material required by the Standard Course of Study over a year, compared to a single semester. Student retention of material in the long-term was also an issue for many teachers. In addition, many teachers experienced frustration at the lack of student urgency to learn the material, given the rapid pace that teaching on the block schedule requires.

Teacher responses were also mixed on whether the block schedule was beneficial for teacher-student relationships. Some felt that needing to teach the
curriculum at a quicker pace interfered with their ability to get to know the students, while others believed that 90 minutes allowed teachers to get to know students better. In addition, teachers expressed concerns about not being able to see student growth and not being able to remember students’ names in later years, whereas it was not an issue with the traditional schedule. Again, the A/B schedule may fare better in this regard since teachers have a year to get to know their students; however, teachers on the A/B schedule also mentioned having a harder time initially learning students’ names because they have all 180 students at once and they see them every other day. Whether discipline problems were more abundant with the block schedule was also mixed. One advantage cited by some teachers with the 4X4 schedule was that they liked the fresh start; however, teachers with the A/B schedule also mentioned that they liked not having to re-teach procedures to a new group of students mid-year.
Research Question 6

What are the current needs of science teachers to successfully continue the block schedule?

Results of Research Question 6

Topics in this section were grouped based on factors for which science teachers are interdependent on policy-makers, counselors, administrators, and other departments. In this section, science teachers’ experiences were related to issues that are controlled or influenced by outside human resources. These items include: student schedules, course sequencing, course offerings, calendar issues, student support services, copy counts/contractors, class space, and the impact of science instruction based on math department issues with the block schedule.

Themes that emerged were: (1) Scheduling and Sequencing Issues Can Impact Teachers’ Experience With the Block Schedule, (2) Course Offering Issues Can Affect Teachers’ Block Experience, (3) Student Schedules and Course loads May be Problematic for Teachers, (4) Calendar Issues May Impact Teacher Instruction on the Block, (5) Student Support is Necessary for Assisting Teachers on the Block Schedule, (6) Increasing Copy Contracts Are a Necessity for Teachers, (7) Adequate Facilities Must be Given Priority for Science Teachers in Block Schedules, (8) Math Issues with the Block Schedule Impact Science Instruction.
Scheduling and Sequencing Issues Can Impact Teachers’ Experience With the Block Schedule

One issue science teachers brought up is that they recognize that one schedule does not fit all. However, they expressed interest in wanting a schedule that fit with the types of students and curriculum needs. In other words, they wanted “different teachers on different schedules not different schedules for the same teachers.” Other thoughts they had included the following:

I think the truth is that every subject, every teacher, every academic level will require a different optimal schedule…As long as a school system says we’re all going to have a one-size-fits-all schedule, someone is not going to be happy, someone is not going to get that optimal schedule. I don’t know if it’s possible to come up with a creative enough schedule or if we’re just going to keep dancing around…ok, now we’ve pleased this group, now we’re going to change this group.

The only issue that I have is that we have this idea that everyone has to do the same thing. I really feel that we are being stifled as individuals. The big push is everyone has to do everything the same way, and I think we are losing creativity. The whole county attitude is everyone has to do the same thing.

In order to do this, teachers suggested having some courses be divided into part I and part II, or made year-long in order to have more time to teach the concepts at a reasonable pace. This was particularly true of the lower Academic classes.

We’ve talked about doing an A block/B block Biology course so they could do it over the year, just like Algebra I. It would help the slower kids.
We paired English and Study Skills got a lot of success here…I wonder if the change in teachers has an impact, like how we changed to one teacher teaching the Physics part and one teaching the Chemistry part in Physical Science. I think sometimes the kids need that, to get the reprieve and fresh start quarterly.

Teachers also suggested that some subjects and/or students may be suited for an A/B schedule where the course meets every other day for the year. At the end of the school year, students would have two credits.

I think a mix works…some courses do better with 4X4, some work better with A/B. With the courses that have more curriculum like AP and Honors, will do better with A/B because they will do the homework. Academic level might completely forget everything over the course of two days.

**Course Offering Issues Can Affect Teachers’ Block Experience**

Teachers also suggested the block of the day the course was offered and what type of course it was also influenced their experiences. To be successful in Academic classes, it is recommended by teachers not to schedule core Academic classes, such as science, the last block of the day. Teachers explain that students’ attention spans are especially poor at this time of day, in addition to medication wearing off for special needs students.

When this school was set up, there were alpha and omega classes. We had a 45-minute period at the end of the day…if your planning was fourth period, your planning was shortened. Most of the classes that were run were Algebra I-A and Academic classes…the ones where the kids generally need that time…but it’s at the end of the day when it’s useless and their medication has worn off.
This school used to do the three blocks and then an hour-long Interest class and then they had the fourth block could be the yearlong 45-minute class. My first year, I had the Academic Earth Science class fourth block and it was *the worst experience of my life*…and when at the end of semester, the classes changed and they didn’t…you have to be careful not to put certain classes on teachers the last period of the day.

When students are scheduled in mixed-ability classes, this is also difficult for teachers, since there is often a marked difference in maturity, reading, or math levels between high- and low-ability students. This makes it difficult for teachers to meet students’ needs in mixed-ability classrooms. To be successful, counselors, administrators, and department chairs need to evaluate teachers’ course sections and make them as homogeneous as possible in terms of ability.

I think it is really hard when the kids are mixed…I had a self-contained class on the block and it was *very nice* because it gave us the extra time to do all the topics…and with the advanced classes you can move quickly. But when they are mixed together, it is *hard*, because you have to get through certain things for the test, which does or doesn’t relate to block, but you have to get through certain things for the test, and you don’t have the extra time to use for those students who need help. I think it’s really nice, but there is no advantage to mix the two levels together. Then you don’t have the extra time and you can’t use the extra time for more labs or activities with the upper-level students, you just get stuck in the middle.

**Student Schedules and Course Loads May be Problematic for Teachers**

Teachers described multiple issues with students’ schedules and how this impacts their classrooms. First, they expressed concern about students taking too many AP classes. When high school students take AP courses, they are taking the equivalent of a college level course. In order to have a better high school transcript, some students have a tendency to take too many AP courses in order to
improve their GPA or to stand out for college admissions. Fall semester can be particularly overloaded, since this is the ending point to what a college admissions counselor would see in making a decision to admit the student. When students are overloaded with coursework, their ability to give attention and time to all courses decreases. This can impact teachers when students do not come to class prepared. In order to be successful, AP courses should be limited to no more than two per semester.

That’s another thing. Guidance department and parents are part to blame. They let them and they push them for this overload of AP courses, and they cannot handle the workload. They are high school students…not 19- and 20-year-old college students.

Teachers also expressed concern with too many math and science courses taken in the same semester, since there is often an outside practice component and these tend to be heavier homework-assigned classes.

They get overloaded and they have Chemistry and Algebra II at the same time…or Biology and Chemistry…or two math classes…two science classes…and they just don’t have enough time to put into them and doing the homework…and doing what they need to do to keep up with the class work.

Other issues mentioned by science teachers included getting students who had not met the prerequisites for the course. Given that teachers have their own Standard Course of Study to teach, it is difficult to both teach that curriculum and remediate in a second curriculum. In order to be successful with the block schedule, teachers need the support of other teacher recommendations, administrators, counselors, parents, and central office, in upholding those
prerequisite guidelines and pathways for students.

What made it that much harder for AP Physics was we had to let kids in who had not had Physics...we had to let kids in who had not had regular or Honors Physics...most high schools have a prerequisite students have to have Physics or Honors Physics. Then they'd have a shot, if every kid had had Physics before then...but when you had both or the majority of kids who had not taken Physics...thank goodness these kids were so smart they could learn a lot on their own and do some as independent study. You hope they could get a few questions right.

On the other extreme, science teachers expressed concern about the lower-level students and the need to repeat the course. They mentioned that sometimes the course is not offered, and there are also problems involving getting the same students again. In order to be successful, science teachers need more course options for lower-level students who need that extended time to learn the material. In addition, if a teacher has already had a student in a course, every effort should be made to place that student in a course with a different teacher who has a different teaching style.

What I hate is when a student does fail in the fall, they put them right back in the class in the spring with the same teacher. You say, “Weren’t we just here?” If they fail it one time, what makes you think they are going to pass it this time?

In Biology, if they fail the class in the fall, there are too many kids already taking it in the spring. The class may be full unless they are a senior needing it to graduate.

Another reason they said if a student fails, they can take it again...but sometimes that course is not offered in the spring!

What we did with Freshmen Academy...no ninth-grader took an EOC in December. Our scores went through the roof. In May, kids had traction in
English I, Geometry, and Algebra I. We did not overload the kids. I thought A/B block was great, but what if you have failure- they’re done. We can’t save everyone. Sometimes these kids fail in the fall and then retake courses in the spring.

In order to be successful on the block, some teachers felt that the students they taught needed better course schedule guidelines or better schedule screening in place so that students are not overloaded when they take their science classes.

**Calendar Issues May Impact Teacher Instruction on the Block**

The most problematic calendar issues with the block schedule are (1) AP exam issues with the 4X4 schedule, (2) Final exam issues, (3) Fall exams taken after winter break, and (4) Spring semester having fewer contact days than fall semester. For AP classes, teachers mentioned these issues:

On the block, you schedule your AP classes according to when the kids can take them, not necessarily when it is most logical. So you want to schedule it so they get most of what they ask for, which means they may have to take AP Biology in the fall, and then they don’t take the exam until the spring.

A lot of schools do that where it’s a semester course and it just simply doesn’t work with AP. We’re lucky here, where it’s either a dual-course everyday or an alternating day…and with an alternating day, in AP Environmental, we still can’t get it all in…but at least with alternating day, you can give them two nights of homework.

In terms of the final exam, schools are now having one exam per day (whereas they used to double-up and administer two per day), which also shaves days off of the full semester. This is particularly negative for the A/B calendar,
when all eight exams are scheduled at the end of the year. The reason for having one exam per day is that EOC courses do not have exam time limits.

My Marine Ecology class is only a quarter long anyway…so you just took off 10% of the course by extending the exam schedule.

Some teachers felt it was a negative to not get new students right when they came back from the holidays.

As far as the spring semester having fewer calendar days than the fall semester, this again becomes problematic for AP teachers on the 4X4 schedule, who get new students the last week in January, and are expected to test in early May. Teachers also recognized that unforeseeable issues come up in the high school day, for which more time is taken away, or that time is taken away for specific groups of students.

On the block schedule, there are things you have to do in high school, and then they will take two or three days for assemblies…and that’s more time taken away…and the Friday before exams for fun day, we won’t have any seniors; the schedule is disrupted.

To be successful on the block schedule, teachers need as much time as possible to be reserved for instruction. This might include cutting down on time-wasters like morning and afternoon announcements, phone calls to the classroom, limiting the number of assemblies, pep rallies, and time that students may be taken away from instruction. If at all possible, extra curricular events should be done before or after school, or should make use of students’ free time at lunch.
Student Support is Necessary for Assisting Teachers on the Block Schedule

Some science teachers felt there was a need for more support for students on the block schedule, especially for those lower-level Academic students. They expressed the concern that the block schedule is not for all students.

I don’t know what the exact point of the block is, but I would imagine that we would expose kids to more subjects, topics, and electives…but there are some kids who don’t need more. They need one for a long period of time because they just don’t get it. So, we are just forcing them to go more and more and more, take more stuff…and they may not be getting a cohesive educational experience because they are just switching. If you are not an accelerated student who can keep up with that, your education looks mixed up.

By the time teachers get to know the students’ learning styles, strengths, and weaknesses on the 4X4 block, it may be too late to make an impact.

I think with block scheduling too, you miss out because we don’t have them for the year. If they are having struggles, by the time you play phone tag with the parent, get the counselor involved, maybe you have to go through an administrator. By then, it is nine weeks in and the kid has already managed to dig himself a nice hole that is sometimes impossible to get out of. The outside involvement is harder on block schedule because you can’t wait to call a parent, no matter how busy you are.

Teachers on the A/B schedule also expressed worry for particular types of students.

One of the things with me doing Student Support Team…a common theme with a lot of the ninth-graders, is it is just the level of disorganization…it is just not there. Freshmen really need the structure in transitioning to the A/B schedule. They have a hard time remembering their A-day backpack or B-day backpack.
When you see them every other day, they forget they haven’t done something. It snowballs. I had one girl to come to me and I said, “What has been successful thing in my class but not others?” Every week, you give me a missing task list. It never got overwhelming. It helped me stay on task. You have to stay on top of the ninth graders and their missing tasks.

In order for teachers to be successful with the block schedule, student intervention plans must be in place early for those teachers on the 4X4 block schedule. This identification of students who are struggling should occur as early as the second week of the semester. By the time the first interim reports go home to parents, the semester course is 25% over. Freshmen particularly need support early on due to lack of maturity and organization.

**Increasing Copy Contracts are a Necessity for Teachers on the Block Schedule**

The only common theme brought up in all eight interviews was teachers having issues with insufficient copies on the block schedule. However, what is interesting is that their schools dealt with this copy issue in different ways such as pulling the plugs, embarrassing teachers by highlighting their names on a bulletin board, or teachers mentioned also they felt they had to beg for more copies.
I’ve seen an increase in my copying just because everything is accelerated. We just have to go through some things faster…I can’t take the time for you to take notes. I have to copy them for you. Especially with my lower-level kids, if we move from activity to activity to activity, they need a worksheet to follow every time. They are not good independent workers. They don’t copy stuff down…if they don’t have something in front of them…I know I copy more than I prefer but if I didn’t, we’d spend 45 minutes on one thing…we can’t keep up the copies. I personally am always in a copy crunch.

For everyone on block we’re going to have more copies because everyone has more students over the course of the year. On traditional I had 120 students…on block with two semesters with 90 now I have 180 students…so that’s 60 more copies for every assignment.

To be successful with the block schedule, teachers simply need more of the budget designated to paper and copy contracts.

Adequate Facilities Must be Given Priority for Science Teachers on Block Schedules

In order to conduct safe labs and teach science appropriately, science teachers need space, water, and access to safety equipment. With the block schedule, if science teachers are to conduct more labs and take advantage of the 90 minutes to do so, they must have the appropriate facilities.

Earth Science was taught in a trailer last year…Physical Science was taught in a trailer…they don’t have sinks or supplies…can you imagine pushing your roving cart up to the double-wide with lab supplies?

Buckets of water was how we did Marine Ecology…

We should not be expected to teach lab in a non-lab room. In some schools you have to sign up for lab to use it.
I’ve seen a janitor’s closet being used as a classroom as well…I’ve seen a science teacher in a government room…he had carpeted floors, no sinks, regular desks…

Math Issues With the Block Schedule Impact Science Instruction

With math being skill-based, math courses have particular dilemmas with the 4X4 block schedule. Retention issues can be markedly problematic, especially when a student takes a fall math course one year, and a spring math class the following year. Since math knowledge impacts science, especially with the physical sciences, these issues can influence science courses. It can also be challenging when students have not taken the appropriate math course before taking upper-level science courses; for instance, taking Chemistry before Algebra II. Particular comparisons teachers voiced were:

That is a big issue in Physical Science. When you’re on the block schedule, you don’t have time to teach the math skills to do the science problems. When you are not on the block schedule, you have plenty of time to review the math.

The other problem with the block schedule, too, is when you have students who are struggling in math, they take Algebra I, Geometry, and then Algebra II; there can be a semester or two in-between their math classes, in the fall of one year and then the spring of the next, and so there is too much time that has taken place in-between, and they have forgotten the basic fundamentals.

We have seen significant improvement with kids who have had Algebra II before Chemistry. It’s hard to teach pH with negative log when they don’t know what a log is.

For science teachers to be successful with the block schedule, counselors, administrators, and parents need to pay particular attention to the prerequisites for
upper-level courses. If students do not meet those prerequisites, their schedule needs to be adjusted. In math, for instance, one would never promote a student from Algebra I to Trigonometry. The same applies in science to students who may need to take Physical Science as an intermediate step before they are math-ready to take Chemistry.

**Teacher Suggestions for Improving the Block Schedule**

From the open-ended survey results, when asked the question, “What suggestions do you have for improving the block schedule,” teacher responses varied: (1) the 4X4 teachers wanted an A/B Schedule (34%), no suggestions (24%), teachers suggested modifying some classes to make them year-long (11%), some wanted to return to the traditional schedule (10%), and others suggested giving teachers more instructional resources (4%). Other ideas mentioned included the following: (1) provide study halls, (2) have shorter blocks, (3) give teachers common planning time, (4) shorten the state curriculum, (5) mix 50- and 90-minute periods, (6) lengthen the school year, (7) give longer breaks in-between classes, (8) allow for more workdays, (9) modify the schedule for different students, (10) lengthen the school day by 30 minutes, (11) limit class size to 24 students, (12) provide tutoring support, (13) limit teacher preparations to two, (14) give department chairs an extra planning period, (15) have exams before Christmas, and (16) provide lab assistants. The number of blank surveys for this question was 28%.
When teachers were asked to respond to the question, “What are your current needs to maintain successful continuation of the block schedule?”, teachers responded as “not sure” or “nothing” (22%), needing more instructional technology or resources (10%), restructuring the curriculum (10%), giving teachers a common planning time (9%), providing more methods and teaching ideas (8%), and needing more lab materials (8%). Additional needs included: (1) more remediation and tutoring support, (2) more workdays, (3) discipline support, (4) fewer class interruptions, (5) go to an A/B schedule, (6) have less students, (7) not roving or floating into other classrooms, (8) have less duties/coverage of classes, (9) calendar change/schedule issues, (10) fewer preparations, (11) year-long classes, and (12) student lab techs. The number of surveys left blank for this question was 14%.

To summarize, teachers recognized that there is no perfect schedule; however, they expressed interest in having different schedules within the same school to accommodate diverse student needs. In addition, teachers pointed out that counselors and administrators can help by scheduling classes during certain blocks of time, eliminating mixed-ability classrooms, not allowing students to overload their schedules, and ensuring that students who fail in a teacher’s class the first time are not placed back into the same teacher’s course. Teachers also expressed discouragement with the current calendar constraints, especially where exams were concerned. Furthermore, teachers believed lower-level students
needed more intervention strategies by means of student support services on the block schedule. Also, the most common theme throughout the interviews was the need for more copies. Given that teachers are teaching the same content twice in a year, have 180 (block) versus 120 (traditional) students for the year, and are expected to vary activities, more copies are needed. Science teachers also need space, water, and access to safety equipment to effectively do their jobs. Finally, the impact of math on science cannot be ignored on the block schedule. Any block issue problems affecting math will eventually impact science, especially in the later years when students take Physical Science, Chemistry, and Physics.
Research Question 7

How have science teachers’ experiences changed over the past four years with the implementation of the block schedule?

Results of Research Question 7

Data for this section came from interviews and the open-ended survey questions. These topics were grouped together because these were comments made suggest that teachers’ experiences had changed with the transition to the block schedule. Themes that emerged especially for EOC teachers were: (1) There is More Emphasis on the End-of-Course Tests, (2) There is More Stress and Teacher Fatigue in the Long-term, (3) Teachers Must Make High-Stakes Curriculum Decisions With Testing and the Block Schedule, (4) Teachers Feel More Behind and Inadequate in the Long-term, and finally (5) Science Teachers Convey Mixed Reactions When Asked if They Would Like to Continue the Block Schedule.

There is More Emphasis on the End-of-Course Tests

When teachers are faced with limited time and have a lot of material to cover, the emphasis on testing becomes magnified. Instead of focusing on teaching the course as on the block schedule, there is more emphasis on increasing test scores.
I think from the kids’ point of view, it’s the same…kids are kids. It has made a big divide between EOC and Non-EOC teachers. Before I would never use that term to say, I’m an EOC teacher or I’m not…it was I teach Biology or I teach science. These times of the year, it’s definitely, I am an EOC teacher. My test is in X many days…it comes up a lot in common conversation a lot around the school. I don’t have that conversation about my Astronomy class. It’s making more of a divide between EOC and even AP teachers… I don’t hear it from Non-EOC teachers.

I’ve definitely had a change…I can remember knowing there is an EOC and wanting my kids to do well…but if I teach Biology the way I know how to teach it, they are going to well…but now so much more of that test is in my mind. I almost feel like I’m starting to flip back to…as opposed to just teaching Biology as this great subject…I’m worried about is this really related to the test?…Should I do labs? What objective on the lab…? I’ve got to make sure…I’ve got to get those test scores up. I think there’s value in having state testing to hold people accountable…but at the same time, I think we’ve almost gone to the whole other extreme in terms of the kind of accountability. I’m not sure that’s not related to when we made this change to block scheduling…that those test scores seemed to take more of a significance.

I remember in first going to the block, I felt very rushed. With the EOC there is so much pressure, and not enough time.

There is More Stress and Teacher Fatigue in the Long-Term

In some ways, moving to the block schedule has contributed more to teacher fatigue in the long-term. Whereas before, teachers would teach 120-140 students on the traditional schedule, with the 4X4 schedule, teachers are teaching the same material twice in the year, and with the A/B schedule, teachers have all 180 students at a time. Adding the stress of EOC courses could also induce more teacher fatigue.
That may be true in an elective course or Earth Science because I have seen a difference…but I feel *more stressed* with Biology. I don’t have time to work with my low-level students and that is *very frustrating* because they feel lost. You have this test at the end; whether or not we cover this material, it’s going to be on there. I just feel like they are being left behind in the dust because I have to take care of these other 25 kids, and make sure we’re still moving along. I see a difference in Earth Science because I feel more relaxed and I can take my time on certain subjects if they are not getting it. I’m sure some of the other EOC teachers can empathize.

I teach different things back-to-back and I still feel burnt-out because I feel like I have been given so much.

One thing that is good and bad…if I don’t like the way something is going one semester I can *change* it for next semester. On traditional, one period to the next is not a big change. The downside is now that I have taught Biology six times this year, the burn-out is happening *faster* because it is more *intense*. On traditional, it would be three years before I got to that point.

On A/B schedule, I have six classes at 180 students, as well as the parents. Many of us have multiple preps…it adds to wear and tear on the teachers faster…

This view was echoed on the open-ended survey questions:

Teachers are so stressed out with everyone trying to squeeze more work out of us than we should really have to do.

Teachers were also asked to compare their day before and after the block schedule.

Before block, I had more kids; I saw at least 120 a day, 45 minutes at a time. I had more time to build skills that took time. I feel more rushed now. Now on block, I can’t get them to the same level…for example, there was no time to do the research paper. I feel more rushed now with the End-of-Course test.
Some teachers also burn out more because they worry about not being absent from school.

We all keep our fingers crossed we do not miss a day…you cannot miss a day. We are already behind after today’s bomb threat…I don’t know how I’m going to get it all in. I told my kids we are going to have to double up tomorrow…I don’t know how I’m going to get squeezed in.

The kids asked me the other day, “Why aren’t you absent? You haven’t been absent this quarter.” I responded, “Really? Well I guess I’m not going to be because I’ll be here from here on out.”

From the open-ended survey responses, teachers reinforced these attitudes.

There is no down-time to recharge – I have to take papers home over spring break and other holidays – Have to assign homework to students over spring break and holidays – I never did this before block scheduling.

Probably won’t last 3-4 years since it is a constantly overwhelming job. NEVER EVER time to relax, except summer and must plan then.

I feel overwhelmed with amount of grading and stress to keep moving fast in order to cover whole curriculum.

My workload has increased. I’m tired and stressed and would leave teaching if I could. I also look at teachers in some other disciplines who don’t have anywhere near the same workload and I feel resentful.

However, not all teachers felt the block schedule made them burn out more in the short-term.

The traditional schedule was very tiring. When you are teaching one thing all day long and you have it six times versus four times…it is hard to keep track of what you told to which class, when. It is a lot easier with four classes.

I think on the good side of it I know going from traditional to block myself, just the decrease in the number of students was just a relief…so many fewer grades to take care of, kids to keep track of, and parents to call. So from that point-of-view, that bit of workload decreased.
In relation to this topic, some teachers questioned why Wake County moved to the block schedule, especially whether it was actually based on educational research or motivated by reduced hiring.

I think the main reason is that they can put 180 students through a curriculum versus 120 students. It’s not as cut-and-dry as they are making it.

One nice thing from the school system is they are getting more out of their teachers this way. They are getting six classes out of their teachers instead of five. It’s less hiring.

**Teachers Must Make High-Stakes Curriculum Decisions With Testing and the Block Schedule**

With End-of-Course testing and the block schedule also comes high-stakes curriculum decisions for the courses and types of students one teaches. However, this is not necessarily negative, as some teachers point out that it forces them to be purposeful and efficient with their time.

It also comes down to planning...you have to plan for if they get done early. When I first started teaching, I looked at college kids’ syllabi, I noticed that the EOC covers a semester and a half of college Chemistry. Once I put this in my mind, this is how fast we have to go and how much we have to cycle it. So they see it once, twice, three times...it is a never-ending nightmare until you get it...and then it comes back in reviews...Spring semester is always harder because “senioritis” kicks in. Here we have spring break and nothing happens after spring break.
I don’t necessarily hate block scheduling…but it really does come down to the low-level students not being able to keep up. As a teacher, you feel frustrated because there is only so much you can do for them…Here I am trying to teach Mendelian Genetics in three days. There is not time to do the practice problems for homework. I tried to modify it this year and give them practice problems even though we were not on that unit. When we were on traditional schedule, I could assign homework for more than a week and they could come in, we’d talk about it, and practice it each day. I really feel strongly that there should be some other option for them.

The students lose that processing time and I think what the block does is it forces you to be more efficient with what you teach…but that does not necessarily correlate with more effectiveness. Because you can be real efficient in getting information to the students but there is not a direct correlation with how effectively the kids are learning because they don’t have that processing time…

On the survey, teachers were asked to respond to the statement, “I believe block scheduling is a better way to organize school time.” Of the responses, 32% disagreed with statement, while 44% agreed with it. When asked to respond to the statement, “90 minutes per period is the right amount of time for my subject,” 30% disagreed with this statement, while 57% agreed. Finally, teachers were asked to respond to the statement, “I use time more efficiently on the block schedule,” 32% disagreed with this statement, while 45% agreed with it.

Some teachers wanted to maintain the block schedule because they were comfortable in their current position.

I’ve already changed all my plans to block. I guess if we went back to traditional, I could change them back, but I’d prefer to stay.

I wouldn’t like the change. Change is hard and painful. So no, I would not go back. I like the 90 minutes. I have gotten to the point where I have near perfected it.
Most of my experience is with block. I would want to stay with it because it’s easier. I don’t want another change.

I think this environment at this school, because we have always been block…for those of us who were here, even before the county transition, it was a non-issue because we have always been used to it. I have spent my whole career here.

**Teachers Feel More Behind and Inadequate in the Long-Term**

A few teachers admitted that at the end of the course, they failed to teach all of the Standard Course of Study or that students did not keep up because of the time constraints.

I am guilty of sending kids into this test…25% of their grade riding on it, and you *never* even talked about X.

IB Chemistry taught on A/B schedule…I’m finding that the processing time on an A/B schedule *in theory* is great…but in practice the kids don’t use it because they wait until the night *before* to think about Chemistry for the next period so they have not taken advantage of the extra day. The AP students lose instruction because obviously when the other kids are there I have to focus on them. So I’m behind. Not tragically behind, but I am *behind* in AP Chemistry because I designed the course for the entire year, but I don’t get to see the kids or interact with them but basically half the time.

I remember one of the other things they told us was that students will be taking less classes so they will spend more time on homework. I don’t see them doing *more* homework. I see them doing *less*. I think that is contributing to the decline in grades. They also told us they won’t be having more than two core classes in a semester so they will only have homework in two classes…so don’t worry about those 30 hours they are losing. They will have plenty of time to do the homework that you need to assign them.

Quotes from the open-ended survey question included:
I feel like we are very rushed to get information to the student that I have dropped many labs and activities. I have assigned more homework and less homework gets completed. I photocopy more notes for student instead of them copying notes. I feel less satisfied that I am doing the best job!

Additional responses from the survey were: teachers were more stressed (8%), using more variety of teaching methods (7%) more rushed (5%), more relaxed (5%), and no change (5%). Other responses were: (1) I’m a better teacher, (2) using more student-centered approaches, (3) students have no sense of urgency, (4) student failure has increased, (5) student motivation has decreased, (6) it is detrimental to student-teacher relationships, (7) everything is more EOC-driven, (8) teach more to the test, (9) students take longer on tests, (10) more preparations, (11) cover more material, (12) cutting out some activities, (13) less time for collaboration, (14) less in-depth teaching, (15) can reach more students, (16) more reliance on the Professional Learning Community group, and (17) better classroom management skills. Thirty-two percent responded they had only taught on block, while 19% of surveys were left blank for this question.

Science Teachers Convey Mixed Reactions When Asked if They Would Like to Continue the Block Schedule.

At the end of the interviews, teachers were asked a final question about whether they would like to remain on the block schedule or change. Some teachers had a definite opinion about wanting to go back to the traditional schedule.
I used the shorter time more wisely on traditional.

I would go back to it, unless the curriculum changes. It was just so much easier for me.

From the students that I have experienced, I think they would do better on traditional schedule.

For Physical Science, I would prefer traditional because I am teaching the lower-level students, it would give them extra time, we could review math skills, and go over extra word problems. If I were doing it just for the lower-level students, I would go back to traditional.

I prefer traditional. It gives me more time to get through the material and move at a slower pace for the Biology students.

This is my 11th year, four years on block. If I had my choice, I would go back to traditional. I thought kids learned better, we had their attention, there were less discipline problems. I did better on traditional. AP Biology, don’t get me started. It needs to be year-long. It’s hard enough to get in on traditional schedule. It burned me out on block. I will be glad not to have it.

We had 55-minute periods. There would be an occasional lab that went over, but most I did not have to. I don’t think it’s worth sacrificing the extra days…

I would switch back to traditional in a heartbeat. I absolutely think block scheduling is the worst thing we could do for these kids…there is no continuity, taking a semester of Spanish then one off…absolutely ludicrous. Trying to fit that much information into a short time period like that…horrible. I think the block schedule is one of these educational myths that is good in theory…horrible in practice.

One teacher wrote on the open ended survey questions:

I consider block scheduling to be the single worst influence on my teaching career.

Many teachers wanted to stay on their current block schedule. However, some said they liked the block schedule only under certain conditions.
With A/B you only have to prep a lab every other day, and you have two nights to grade things…

I definitely like the A/B schedule. I’m not good with the three-ring circus. You have time to wrap it up for understanding. I can’t imagine doing labs on traditional. You don’t talk to them, just get started…then we’re starting a new topic.

For the operation of the school, I think the 4X4 block is better. For the operation of the kids and student body, I don’t…unless the curriculum is changed to be able to appropriately address the Standard Course of Study in the amount of time given.

With the primary students that I teach, upper-level on an A/B block, it’s the closest thing to a college schedule. No, I would not go back.

I would like to stay. I think the labs are the biggest reason. There is nothing worse than trying to dissect a frog over two days.

I would stay on block mainly because it gives me the sense of urgency that I need and the pressure that I strive on. It helps me to focus on goals and tasks that I need to accomplish.

Going back to student numbers, grading, five classes of 30 kids and parents, special education, 150 parents informed, not 90…I just don’t think you’d do as good a job keeping everyone informed.

I would say, I would not go back. The main reason is I am more productive on block than traditional. Whether my students are more productive, I don’t know. I honestly don’t think they are learning with the depth of knowledge they did before. I think they cram what they need to know for the EOC, but do they really know Physics…no.

I am really ambivalent, because there are half of the things that I love about the block and half of the things I hate about the block. What I really want to do is to stay on the block year-round. That is what I really want, but it is too much to ask. The AP Biology is a beast if not year-long on the block. There are others…I would stay on the block.

The difficulty that I had on the traditional schedule was I was very limited in my lab investigations in class because of limited time. Anything that was longer than 30 to 45 minutes I had difficulty doing.
Some of the teachers with less than three years of experience did not know anything but the block schedule. For these teachers, the unfamiliarity with knowing how to manage another type of schedule was a factor. The other reason was that these teachers liked the 4X4 fresh start, especially when it came to discipline and getting new students.

I like the block also, the way that we have it, but it is all I’ve taught on. I did my student teaching on a regular schedule but it was with two different teachers. The discipline, getting to start over in January with a whole new group, the reworking things from one semester to another…are all advantages.

I went to high school on block. All of my education classes were geared towards block. My student teaching was on traditional so I had to break it up more. It’s better for me to go to block because that’s what I was used to.

I do agree about switching kids half way through the year. I have only taught on block. I would prefer block because I don’t think I could get through the labs that I do on traditional.

Finally, from the survey data, teachers were asked to respond to the statement, “I would like to maintain the block schedule.” From their responses, 30% disagreed with this statement, while 54% agreed.

To summarize, the main areas where some teachers experienced the greatest change from going to the block schedule from traditional were: (1) More emphasis on End-of-Course testing, given that time was shortened in minutes comparing both schedules, (2) For some teachers, in the long run, there is more stress and fatigue due to having to teach the curriculum twice in a year, not
feeling like they can be absent to take any sick days, and maintaining the rapid pace. However, in the day-to-day operations of the classroom, for some, having four periods a day is preferable to six or seven on the traditional schedule. (3) For teachers of EOC classes, they face more high-stakes curriculum decisions. With more limited time, they must be purposeful in choosing the way they structure class time and decisive about what to include as far as assignments. (4) Teachers also expressed concerns about always feeling behind due to the standard course of study and student pacing constraints. Finally, (5) when teachers were asked whether they would prefer to remain on the block schedule, reactions were mixed. The biggest reasons for preferring the traditional schedule included student attention span, student ability levels, and course pacing. Still, some teachers wanted to try a different block schedule, in which they could switch from 4X4 to A/B. For those who liked the block schedule, the biggest reasons cited were more time for labs within the 90 minutes, the longer planning period, having four blocks instead of six or seven periods, and the fresh start with the 4X4 calendar. Some teachers also acknowledged that the block was all they had known, and they did not want to change back to traditional because of the difficulty of the transition.
CHAPTER 5

Introduction

This study provided an overview of the issues and dilemmas science teachers faced in the 2006-07 school year regarding the change to the block schedule in Wake County, North Carolina. The purpose of this research was to address gaps in literature related to: (1) changes that teachers had made in their instruction and interaction with students, (2) the role of teacher preparation and staff development for the block schedule, (3) the type of teaching methods used in block classes, and (4) a study of teachers’ perceptions of the block schedule after implementation. Since the majority of research had focused on student achievement outcomes, more research was needed in regard to teacher attitudes and perceptions about the block schedule as an instructional tool.

Through a sequential, mixed-methods approach these research questions were investigated using a test for significance:

1. Is there a difference in science teaching methods used between End-of-Course and Non-End-of-Course teachers with the block schedule?

2. Is there a difference in science teaching methods with respect to teacher experience level (number of years teaching) with the block schedule?

Data analysis through a phenomenological approach was used to discover insights, suggest relationships, and highlight challenges of teaching on the block
schedule. Research questions addressed through qualitative survey questions and focus group interviews include the following:

3. Had science teachers’ instructional methods changed since the implementation of the block schedule?

4. What were science teachers’ current perceptions, attitudes, and feelings about the block schedule as it relates to instruction, school climate, and time/materials management?

5. What were science teachers’ perceived benefits and losses in changing to the block schedule?

6. What were the perceived current needs of science teachers to successfully continue the block schedule?

7. How have science teachers’ experiences changed over the past four years with the implementation of the block schedule?

**Summary of Results**

Seventy percent of Wake County science teachers responded to the survey questions. These teachers represented a range of science subjects and differed in having one to 43 years of experience. However, most teachers had less than 10 years of experience.
Research Question 1

From this data, responses in teacher methods for End-of-Course versus Non-End-of-Course teachers showed significant differences in using outdoor activities, projects, guest speakers, media center visits, and long-term projects. Non-End-of-Course teachers responded that they used these methods more than End-of-Course teachers. Data were also analyzed and compared as to whether teachers agreed with using more of a particular method on the block schedule. Although some methods (cooperative learning, projects, performance assessments, media center visits, peer teaching, long-term projects, outdoor activities, and guest speakers) had significant differences in the average response, many methods had large agreement to the statements across both groups. Methods that had a large agreement included cooperative learning, activities, and labs.

The Non-EOC teachers scored higher on level of agreement for all instructional methods that were significantly different between the two groups. The pattern continued among the rest of the instructional methods. The percentage of respondents who checked “agree” or “strongly agree” demonstrated a high correlation between the teachers of Non-EOC and teachers of EOC courses on all instructional methods ($r = 0.92$, $p < 0.01$). Although the average score on some items showed differences, the responses of both groups on all instructional methods were similar.
Research Question 2

Research question 2 explored the difference in instructional methods based on teacher experience. Data were broken into four quartiles, creating cohorts of 38-39 teachers in groups ranging from 0-3, 4-7, 8-13, and 14-44 years experience. For this analysis, the first quartile was excluded, since teachers in this group had always taught on the block schedule and had no experiences to compare with the traditional schedule. There appeared to be a consistent difference between the least experienced group and the most experienced group.

Although there was high correlation of the level of agreement across all instructional methods, there were significant differences in responses for given instructional responses when comparing the 4-7 years experienced teachers with the 14-43 years experienced teachers. The 4-7 years experienced teachers showed a higher level agreement when asked if they use more paideia, peer teaching, or assigned homework during class time (alpha > 0.005). They also showed a higher level of agreement when asked if they use more role playing and seatwork (alpha = 0.01). Thirteen other methodologies showed a difference at the alpha = 0.05 level, where the 4-7 years experienced teachers continued to show a higher level of agreement. Only performance assessment, laboratories, demonstrations, technology, and guest speakers showed no difference in responses between the 4-7 years experienced teachers and the 14-43 years experienced teachers. This overall picture suggests that the more experienced teachers changed less than the less experienced
teachers across most listed instructional methodologies as a result of being on the block schedule.

This data must be interpreted in light of the magnitude of the agreement as well. For example, there was a significant difference in the level of agreement with the statement that teachers used field trips more often as a result of being on block scheduling, but the average response for both was close to the “disagree” response (2 on the scale). Both groups disagreed with the statement, but the 14-43 years experienced teachers disagreed significantly more.

Research questions 3 through 7 were answered through triangulation of data among percentage of agreement of survey statements, the focus group interviews, and the open-ended response questions on the survey.

**Research Question 3**

Research question 3 dealt with whether teachers felt their instructional methods had changed on the block schedule. In terms of the instruction and assessment, many teachers mentioned that they had restructured their curriculum for the block schedule and had implemented new teaching strategies such as a different lecturing style, more cooperative groups, and activities. However, several teachers described these changes as cutting out labs, inquiry-based learning, and the “fun stuff.” Some teachers stated that they had more flexibility to implement different methods within the 90 minutes. The role of testing, especially in AP classes, presented certain problems, both within the 90 minutes and in the course of the year.
Parkinson’s Law (work expands to fill the time available) was also evident in activities ranging from tests to labs. The role of time management became more apparent in minimizing the loss of instruction.

**Research Question 4**

Research question 4 explored teachers’ opinions of the block in terms of their instruction, school climate, and time/materials management. Teachers appeared to be divided in agreement in terms of whether they had more grading and paperwork on the block schedule. Some teachers felt that classes with Academic students had more paperwork because these students refused to do non-graded work. On the other hand, teachers of Honors classes mentioned that Honors students produced more work to grade because they finished assignments more quickly than Academic students. To alleviate the grading, teachers used strategies of grading for completion, grading only some assignments, and reviewing work in class.

When teachers were asked their opinions on student success with the blocks schedule, responses varied depending on the type of student taught. Many felt that Honors and AP students were doing well with the block schedule. However, some teachers felt that their Academic students struggled with completion of homework, retention of material, special education needs, resource issues, and maintaining attention with the longer blocks of time. Some teachers thought that the traditional schedule was better for Academic students because they received year-long instruction in smaller daily increments.
In addition, the teacher experience also varied with the grade level with which one was teaching. Courses with upper class students tended to fare better than those with freshmen because freshmen have lower maturity levels and are experiencing the transition to high school. Also, in regard to school climate, some teachers indicated that they had lower absenteeism and for students, being absent could be more detrimental when compared to the traditional schedule. Many teachers were surprised that their class sizes were not lower after moving to the block schedule.

With time and materials management, the A/B schedule tended to be more problematic with books, since 180 students needed books all at the same time. In addition, teachers stated that their planning period was spent mostly grading and planning. The third-highest activity during their planning period was preparing for or cleaning up labs. Many teachers regarded the 90-minute planning period as positive, as they thought they were more productive with their time compared to the previous 50-minute schedule. Teachers also recognized the need for restructuring their lessons and to build in more transitions. Finally, for instructional materials, reactions were mixed. Some teachers pointed out that they have two sets of students and are going through the curriculum twice in a year. In addition, with the block scheduling came the need to do more hands-on activities, which also require more money designated for materials.
Research Question 5

Research question 5 focused on teachers’ perceived losses and benefits with the change to the block schedule. Many teachers felt that the state’s Standard Course of Study was designed for a broad overview of content, while the block schedule was built for fewer topics covering more depth. This dichotomy created stress for teachers because they felt they were unable to teach the entire course of study in 90 days, especially considering student constraints such as the ability to retain and process material. For this particular situation, the A/B schedule may be preferred so that students have more time to learn material required by the Standard Course of Study over a year, rather than a single semester. Student retention of material in the long-term was also an issue for many teachers. In addition, many teachers experienced frustration at the lack of student urgency to learn the material, given the rapid pace that teaching on the block schedule requires.

Teacher responses were also mixed on whether the block schedule was beneficial for teacher-student relationships. Some felt that needing to teach the curriculum at a quick pace interfered with their ability to get to know the students, while others believed that 90 minutes allowed teachers to get to know students better. In addition, teachers expressed concerns about not being able to see student growth and not being able to remember students’ names in later years, whereas it was not an issue with the traditional schedule. Again, the A/B schedule may fare better in this regard since teachers have a year to get to know their students; however, teachers on
the A/B schedule also mentioned having a harder time initially learning students’
names because they have all 180 students at once and they see them every other day.
Whether discipline problems were more abundant with the block schedule was also
mixed. One advantage cited by some teachers with the 4X4 schedule was that they
liked the fresh start; however, teachers with the A/B schedule also mentioned that
they liked not having to re-teach procedures to a new group of students mid-year.

**Research Question 6**

Results from research question 6 centered on the current needs of science
teachers to continue the block schedule. While teachers recognized that there is no
perfect schedule, they expressed interest in having different schedules within the
same school to accommodate diverse student needs. In addition, teachers pointed out
that counselors and administrators can help by scheduling classes during certain
blocks of time, eliminating mixed-ability classrooms, not allowing students to
overload their schedules, and ensuring that students who fail in a teacher’s class the
first time are not placed back into the same teacher’s course. Teachers also expressed
discouragement with the current calendar constraints, especially where exams were
concerned. Furthermore, teachers believed lower-level students needed more
intervention strategies by means of student-support services on the block schedule.
Also, the most common theme throughout the interviews was the need for more
copies. Given that teachers are teaching the same content twice in a year, have 180
(block) versus 120 (traditional) students for the year, and they are expected to vary

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activities, more copies are needed. Science teachers also need space, water, and access to safety equipment to effectively do their jobs. Finally, the impact of math on science cannot be ignored on the block schedule. Any block issue problems affecting math will eventually impact science, especially in the later years when students take Physical Science, Chemistry, and Physics.

**Research Question 7**

Finally, research question 7 investigated how teachers’ experiences had changed with the implementation of the block schedule. The main areas where some teachers experienced the greatest change from going to the block schedule from traditional were: (1) More emphasis on end-of-course testing, given that time was shortened in minutes comparing both schedules, (2) For some teachers, in the long-run, there was more stress and fatigue due to having to teach the curriculum twice in a year, not feeling like they could be absent to take any sick days, and maintaining the rapid pace. However, in the day-to-day operations of the classroom, for some, having four periods a day was preferable to six or seven on the traditional schedule. (3) Teachers of EOC classes faced more high-stakes curriculum decisions. With more limited time, they must be purposeful in choosing the way they structure class time and decisive about what to include as far as assignments. (4) Teachers also expressed concerns about always feeling behind due to the Standard Course of Study and student pacing constraints, (5) when teachers were asked whether they would prefer to remain on the block schedule, reactions were mixed. The biggest reasons for
preferring the traditional schedule included student attention needs, ability levels, and course pacing. Still, some teachers wanted to try a different block schedule, in which they could switch from the 4X4 to A/B format. For those who liked the block schedule, the biggest reasons cited were more time for labs within the 90 minutes, the longer planning period, having four blocks instead of six or seven periods, and the fresh start of each semester with the 4X4 calendar. Some teachers also acknowledged that the block was all they had known and they did not want to change back to the traditional schedule because of the difficulty of the transition.

**Comparison of Results to Literature**

**Curriculum and Instruction**

This study was consistent with claims made by Averett (1994) when he stated that time is precious because teachers feel they have less of it, teachers felt it is difficult to eliminate content and must make hard choices on where to cut (Veal 2001). It also supported Knight, DeLon, & Smith’s (1999) study in that teachers tended to cut out the “busy work” and focused more on the Standard Course of Study. It was also in line with Hurley’s study (1997) in which western North Carolina teachers stated that there was too little time for enrichment with a schedule intended to foster depth, rather than breadth. Moreover, it followed suit with McCoy’s (1998) results when teachers expressed the need for more materials and equipment with the block schedule. Furthermore, this study supported Stader & DeSpain’s (1999) study in that science and math teachers disagreed that there was an increase in the depth of
subject matter covered, and student retention of material had improved. Finally, this study defended claims made by Howard (1998) that longer class periods do not compensate for fewer class days for students in math and science when they must reduce the number of concepts covered in class.

In terms of instructional methods, these results were consistent with the studies by McCoy (1998) and Creamean & Horvath (2000), when teachers stated that they had experimented with more variety in instructional methods. Specifically, these results verified Salvaterra & Adams’ (1996) findings, in which teachers reported using more cooperative learning with the block schedule. Results were also congruent with Averett’s (1994) study, when science teachers acknowledged that while there is more time in the day for labs, there is less time in the course for that purpose because of the amount of content expected to be taught. Finally, results of this study were conclusive with research done by Canady & Rettig (1995); and Wilson & Stokes (1999a) when teachers agree that the longer planning period is a major motivator to adopt block scheduling.

Results from this Wake County block research revealed that the protection of the planning period depended on the school and leadership. This was partially consistent with the research done by McCoy & Taylor (2000), when schools used the planning period time for meetings and staff development. In addition, in Huffman’s (2005) report, the school media centers were used more with the block schedule.
While this may be true in some courses, for this Wake County study, it often depended on whether the class was End-of-Course or Non-End-of-Course.

**Student Relationships and Classroom Climate**

This study was consistent with the results from Reichstetter & Baenan’s (2005) study, in that teachers’ challenges continued to be the faster pace and difficulties created in the teacher-student interrelationship created by time constraints. This study was also supportive of Veal’s (2001) study, when teachers expressed anxiety over where to eliminate content and because of the time reduction and pressure to cover the curriculum, personal relationships were negated. According to knowledge claims by Calvary, Sheets, & Bell (1999); Hayley (1997); Northeast and Islands Regional Educational Lab (1998); Pettus & Blosser (2001); Queen (2003); Stader & DeSpain (1999), block schedules are designed to reduce the number of students teachers must prepare for and interact with each day. However, while some teachers felt this was true, other teachers claimed they had more students per class than they did before the block schedule. In this regard, it was partially inconsistent with Lare et al.’s (2002) study when teachers felt they could get to know students better. It was also inconsistent with the claim that teachers can develop rapport with their students because they have fewer students (Eisenberger et al. (2000); Weller & McLesky (2000)).

In regard to student behavior, this study supported the work of Tan et al.’s (2002) study when teachers felt that not all students were willing to step up to the
plate academically and allow themselves to be taught and prepared (student sense of urgency). In addition, the study was partially inconsistent with Knight et al.’s study (1999) when teachers’ class sizes were smaller, students used better study habits, and students received more personal attention. However, results of this study were in line with the magnification of student absences being problematic, students having to keep up with books and due dates (on the A/B schedule), and the difficulty some students have in paying attention for the longer period (Weller & McLesky, 2000).

Finally, in terms of classroom climate, these results did suggest that teachers spent extra time that first year of block implementation, when they recognized and adjusted to the rhythm of the school schedule the first year on block, rather than addressing the needs of learners (Shultz, 2000). However, these results were inconsistent with McCoy and Taylor’s (2000) study, which stated that teacher absenteeism was higher with the block schedule. For this particular study, Wake County teachers felt they could not miss days on the block, for fear of getting behind in the schedule.

**Interpretation of Findings**

**Methods of Teaching Science on Block**

Research question 1 examined the use of science teacher methods between End-of-Course and Non-End-of-Course classes. The methods that Non-EOC teachers tended to use more were outdoor activities, guest speakers, media center visits, and projects. The temptation with the block schedule and End-of-Course classes is to
lecture more. According to J. Allen Queen, a researcher at UNC-Charlotte, educators feel they have to lecture more because there is limited time to use interactive methods with students given the amount of content to cover in preparation for state-mandated tests (Queen, 2003). Lecturing allows teachers to cover a large amount of content in less time than other methods, and requires little by way of materials. One teacher who taught both an End-of-Course and Non-End-of-Course class summed up his classroom experiences this way:

I have never heard an EOC teacher say they have too much class time. All of the pressure I feel, giving up the day, the anxiety, etc. only applies to the EOC Biology course. The Astronomy class is more relaxed, more enjoyable, no big deal because of that environment. In Biology, when we are behind for things outside of my control, then I have to tighten up and cover the curriculum. We have to double up on assignments, more things are getting thrown at them, and we don’t have the option to skip it. I never worried about EOC classes until the block schedule. I just let the chips fall where they may and my results were always the same score-wise. I feel it now more on the block schedule, that’s for sure.

End-of-Course teachers feel there is less flexibility to explore other teaching methods. However, in terms of specific methods used, from the focus group interviews, it was evident that some subject areas may lend themselves more to outdoor activities and inquiry-based learning. While this was also true with the traditional schedule, with the 90-minute block schedule, students can perform more meaningful experiments, given more time, and teachers may be more likely to take them outdoors. Also, as far as guest speakers, it should be mentioned that during the time-frame of this study, there was a very public debate about a religious speaker at a
school (that was not participating in this study). This resulted in some policy changes that may have also hindered teachers from requesting guest speakers. The policy change required teachers to have speakers obtain volunteer clearance (a process that can take a few months) and principal approval. In addition, media center policies and resources vary from school to school. In some instances, it is an issue of logistics. It also requires long-term planning (which is particularly difficult with younger teachers) and other teachers mentioned that it is cumbersome when the time is broken into 45-minute segments. Furthermore, it takes students time to get to the media center and settled down.

Finally, as far as projects, teachers indicated that there is little time to explore students’ interests in long-range projects for Non-EOC versus EOC courses. This may even coincide with cutting out the “fun stuff” and the consequences of a student earning a zero in cases where the project is not done, and teachers not wanting to overload students’ course work. On the lower end of the spectrum, teachers tended to do less Socratic seminars, silent reading in class, and field trips. From the focus group interview data, reasons why teachers did not take field trips may have had more to do with the impact on other classes.

If you notice, a lot of classes have taken out their field trips compared to traditional, because the other teachers complain because you’re taking kids out of their classroom.

Science teachers also expressed some anxiety when other courses took field trips, so peer pressure (on the part of colleagues) may also be a contributing factor.
Chorus can be out for two days...so I’ve got all these kids who will be out and miss gas laws and expect me to do all this make-up work after school.

It should also be mentioned that field trips can be cumbersome in terms of planning, costs, and approval at the Board of Education level. They take a lot of advanced planning and parent supervision.

To summarize, cooperative learning, labs, and activities ranked among the highest instructional methods teachers reported using. However, there were differences between the amount used depending on whether the class is End-of-Course, Advanced Placement, or Non-End-of-Course. In terms of lectures, it is still possible to lecture; however, these lectures should be interactive and use skeletal (fill-in) notes, limit talking to 15 minutes at a time, use pictures or graphic organizers, and use summaries as key points. Teachers tend to lecture because they feel they have more control over the time, and are more confident that they directly delivered that Standard Course of Study for which students will be tested. For projects, there are ramifications when students do not do the projects (such as lost point values), students are bused in with the diversity efforts and students do not always live near each other, there is often a monetary cost to projects, and time is a factor. In terms of the media center, there is often a need for more space and more computer access. Media centers may be able to get around this dilemma by putting books on carts and delivering them to classes, or scheduling more classes and putting them in different areas around the media center.
The current North Carolina curriculum was built for breadth, not depth; however, having served on Standard Course of Study Revision committees at the Department of Public Instruction, it is interesting to note that teachers are reluctant to cut material. It is not uncommon for teachers to get into discussions on “How can you NOT teach _____?” In some ways, teachers shoot themselves in the foot when it comes to what is included in the Standard Course of Study. They refuse to remove content, but complain when someone tries to remove it for them. Moreover, they will not teach what is not on the Standard Course of Study.

The major results of research question 2 indicated that 4-7 year teachers showed higher level of agreement with 14-43 year for paideia, peer teaching, assigning homework during class, role playing, and seatwork. Results also indicated that 14-43 year teachers appeared more settled in their ways. Since teachers’ skills develop over time, it would make sense that over time, teachers in the second cohort (4-7 years) would be over the initial three years of classroom management issues and could start to develop themselves in terms of taking more risks with instructional methods. It would be expected that teachers in this group would lean more towards those experienced teachers as far as developing different teaching strategies in some areas. Given that their classroom management skills are more solid at this point, it is expected that these teachers would be able to maintain enough classroom control to manage large group discussion (paidiea), role playing, and peer teaching, as well as keeping students quiet enough to focus on doing homework in class and seatwork.
For the veteran teachers, this group has seen many reforms through the years. They have experience knowing what is “tried and true” in the classroom. It is likely they are non-phased by many reforms such as block scheduling and they are going to continue to teach how they have always taught. Teaching with the methods they have always used may be the only constant they feel they can control as reform movements come and go.

Research question 3 focused on whether science teachers’ instructional methods had changed since the implementation of the block schedule. From the survey data, 80% of teachers agreed with trying new strategies. This restructuring is necessary on the block schedule because, to use a counter-example, if a teacher were to simply paste two traditional lessons together, and the lecture was previously 30 minutes, this would mean an hour-long lecture in the classroom. What was most interesting about these results was the fact that many teachers wanted to do more labs, but due to time overall, the labs and enrichment were the first methods to be cut. Teachers tended to cope with this lack of lab time on the block schedule through different means, such as skimming and skipping past assignments and doing what they could to maximize time.

In some situations, teachers provided examples of where they dangled labs over students heads as incentives for finishing the lectures. Furthermore, many science teachers have the mindset that the lecture must precede the lab. However, there are some approaches, such as POGIL (Process-Oriented Guided Inquiry Labs)
in which the lab precedes the lecture, thus engaging students more in the information. The bottom line is that inquiry and labs do take more time, money, and planning.

Another interesting point was that teachers value the “application” phase of the block, which provides more continuity in the lesson. There is time within the period to do more guided practice, hands-on activities, or work out problems.

Frustrations expressed by teachers included testing not being included in the pacing guides, lack of time for remediation, and some students not doing their part and being accountable. Some teachers explained that if students would do their homework, come to class prepared, and study regularly, the loss in instructional time would be marginal compared with the traditional schedule. However, these days there are too many technical distractions at home (computer, gaming, other electronic devices), as well as overloaded student schedules, and less parent supervision with one or both parents needing to work. However, in the researcher’s experience, those students who know they have to pass the state-mandated test to pass the class (Biology) seem to make more time to study. Perhaps if testing accountability were on students’ shoulders for all courses, it would make a difference in student accountability for learning.
Instruction, Climate, and Management

Research question 4 explored science teachers’ opinions on the block schedule as it relates to instruction, school climate, and time/materials management. In terms of grading and paperwork, it was a little surprising that more teachers disagreed that they had more grading to do on the block schedule. In theory, if teachers graded every assignment on the traditional schedule, they would have 120 students multiplied by two assignments per student per day, further multiplied by 180 days per year, this would result in 43,200 papers. With the block schedule, 90 students multiplied by three assignments per student per day, further multiplied by 180 days, this would result in 48,600 papers. However, teachers did acknowledge that some assignments they graded for completion, some were not collected, etc. The dilemma lies in that more grading means more copies. If students copy notes instead of the teacher providing the notes on paper to the student, more time may be wasted as the students copy. One solution might be making more use of Blackboard, the technology platform. Students can print their own notes and assignments from home, thus using less time and school resources.

In terms of planning, one interesting inference made from the comments End-of-Course teachers made versus Non-End-of-Course teachers, was how they thought about planning their lessons. The attitude of EOC teachers seemed to be “How will I cover the North Carolina Standard Course of Study in the allotted time?” while the attitude of Non-EOC teachers was “How will I fill the time with the North Carolina
Standard Course of Study?” However, one factor that was evident was teachers expressed frustration with not having enough time in the long-term to teach the Standard Course of Study. The need for long-term planning was evident with the block schedule. According to Queen (2003), three basic models will allow for the maximum content taught: limiting content, assigning outside content, and integrating content. In addition, NSTA (1997) states that one unexpected result of block scheduling is that it forces teachers to become better at planning, presenting, and reviewing lessons and concepts. In this regard, the block schedule may be advantageous for teachers. The 2009-10 school year, in particular, has also required Wednesday be Professional Learning Team (PLT) days, where teachers who teach common subjects plan in teams. This may help teachers collaborate and collectively decide best practices for students on the block schedule.

As far as students, teachers acknowledged the block may not be suitable for all types of students, especially lower-level students. However, it may have more to do with what the teachers have students doing within the block period. With the block schedule, teachers need to maintain student interest by having students move more. Instead of having students as passive learners who listen to a lecture and fail to see the importance of note-taking, lower-level students need to be engaged and working with their hands. For example, instead of students taking notes, have them cut out squares of vocabulary, match the word to the definition, and create a sort of domino puzzle.
In theory, the block schedule sounds like it would be better for lower-level students, having two core classes and two elective classes (versus six classes on the traditional schedule). It is also expected that incoming ninth grade students have had partial experience with the block, as many middle schools alternated science and social studies each day. However, lower-level students sometimes must work, babysit, they do not have access to after school transportation, they do not always have homework support at home, and they tend to get behind quickly due to poor study skills and habits. One suggestion might be a required freshmen seminar course or advisory for all ninth grade students. Another suggestion might be to have a tutoring center at lunch or require students to substitute an elective class where they have 45 minutes of one subject remediation and 45 minutes of another subject remediation. As far as school climate, teachers also expressed concern over student absences when students do not recover from missed assignments. Again, the lower-level students tend to be more prone to absences due to lack of access to health care and nutrition, along with suspensions. One recommendation would be to have an attendance clerk or PTSA volunteer collect work for absent students.

One area that has not been taken full advantage of in Wake County is the use of virtual learning. With Distance Learning Advisor support, virtual learning offers repeating students a chance to make up work on their own time, engages the lower-level students with the computer, and is ideal with repeating students where the face-to-face environment has not been successful. Students can also make up credits over
the summer, without having to pay as they would in summer school. Schools could also save on books if the district implemented more electronic books from book publishers.

**Benefits and Losses**

Research question 5 revealed teachers’ perceived benefits and losses in changing to the block schedule. The paradox teachers faced in the classroom was that if a teacher teaches at the students’ pace, he or she may not be able to teach all of the material mandated by the Standard Course of Study. However, if the teacher taught *all* of the material, he or she may be moving at a faster pace than the students. One tactic that may help teachers is to teach the most difficult concepts early in the year. This may allow for re-teaching, or spiraling back to these topics at later times. In addition, students tend to be fresher at the start of the year or semester (and be in less trouble absence-wise) than towards the end. Also, teachers might want to consider using the abandonment model of the 1980’s. According to Queen (2003) content that should be abandoned is superfluous examples, excess content, or information outside the content area that teachers may have added over the years.

However, one cannot ignore that teachers may be limited by too much content, students’ short attention spans, and students not doing their part to process the information on their own. Students will not feel that sense of urgency that teachers do unless they are also accountable for passing the End-of-Course exam. Academic students also have a tendency to procrastinate, they are reluctant to take
good notes, need repetition in smaller chunks, and they often do not write things down and forget. Again a required freshmen seminar the first semester of high school might help to alleviate some of these problems.

As far as student-teacher relationships, as much as the block schedule research praised this topic as a benefit, one surprising comment made by teachers in the interviews was that teachers could not remember students’ names, nor give all students college recommendations because they had forgotten that student after having had him or her. In addition, it was interesting to hear teachers on the 4X4 block say they missed out on seeing students grow throughout the year. This is often the glue that motivates teachers to stick with teaching. However, one comment that was not made was that with school climate, when there are three teachers teaching one required subject, chances are teachers will have had rapport with 1/3 of the student body. This may benefit a school in terms of personalizing the environment from a student perspective. Another notable result was that teachers on the 4X4 block appeared to feel equally as strong about liking the fresh start as the A/B block teachers liked working with students for the year.

Research question 7 investigated how science teachers’ experiences changed over the past four years with the implementation of the block schedule. For End-of-Course teachers, with the loss of time overall, they tended to feel that there was more emphasis on End-of-Course tests. Time becomes magnified for EOC teachers on the block schedule. However, what will be interesting in the 2009-10 school year is how
teacher experiences change, since the state budget did not allow for funding of tests in Chemistry and Physics.

In addition, there was some evidence that the block schedule leads to more stress and teacher fatigue in the long-term. Since the expectation is that teachers do more student-centered approaches, teachers must work harder at lesson planning and execution. They must also re-define what is essential as they restructure past lessons and make high-stakes curriculum decisions. Teachers are also being asked to teach 180 students, whereas they taught approximately 120 with the traditional schedule. Teachers feel like they cannot miss class as much, as they cannot afford to miss a day to teach students content. With an inch-deep and a mile-wide curriculum, this can also lead to the feeling some teachers have of chronically feeling behind. Finally, some teachers felt that the impact on student-teacher relationships did not provide all of the benefits the research claimed, due to the pacing of the course. However, what was most interesting was that when teachers were asked if they would like to remain on the block schedule, nearly 2/3 claimed they would like to stay. What science teachers tended to most value was the time for labs and the 90 minute planning period.

**Requirements for success**

Research question 6 addressed the current needs of science teachers to successfully continue the block schedule. From the interviews, at least some teachers expressed the need for individual schools to have more flexibility in scheduling. In
addition, counselors and administrators can help with making sure the appropriate
math course is taken before some of the higher-level courses like Chemistry and
Physics. In subjects like math, where the courses are more sequential, the reduction
in curriculum has major effects as students move into their third and fourth years
(NSTA, 1997). In addition, perhaps an A/B block model is better for courses like
math because of the sequential nature of learning. Subsequently, there is a need to
provide more opportunities for math and science teacher collaboration and team
teaching, as math lends support for science and vice versa. Another way
administrators and counselors can help science instruction is not to create schedules
where Academic classes meet in the fourth block. By this time, lower-level students
tend to shut down and they need higher levels of engagement, such as Physical
Education or hands-on Art classes. On a state level, there is a need to re-examine the
state calendar to make it more balanced, since there are five fewer days in the spring
semester than in the fall. In addition, students take their exams after winter break,
when some learning has been lost.

One issue that came up in the interviews was the lack of qualified substitutes.
With time being an issue on the block schedule, and teachers not wanting to miss
days, when teachers need to be out, a qualified substitute must be available. Without
qualified substitutes, students tend to get further behind in instruction when teacher
directions are not carried through, or teachers end up taking their planning time to
cover classes.
Another issue for science teachers was the need to have enough space to do their jobs safely and appropriately. With the block schedule, if teachers are expected to do more student-centered methods, such as labs, they must have the necessary space. The National Science Teachers Association guidelines state that no more than 24 students should be in a science lab at any time (NSTA, 1997). Science teachers must be given priority in lowering class size.

An additional need that teachers always have with any reform movement is the role of professional development. Since many of the younger teachers had experienced the block as students, in student teaching, or it was all they had known, it was important to know what kind of training the veteran teachers had had in preparation for the change to the block schedule. From the focus group interviews, it was apparent that the type of professional development varied, depending on the school. Teachers reported various levels of feeling prepared for the switch to the block schedule. From the survey results, when asked to respond to the question, “I think that I am adequately trained to teach on the block schedule,” 71% of science teachers agreed with this statement.

However, from the open-ended response questions on the survey, when asked to respond to the statement, “Describe any staff development your school experienced when transitioning to the block schedule,” 47% of science teachers reported no training, 13% stated that their school had one to three days of training, 22% mentioned that they had not been there for the transition to block, and 18% of the
surveys were left blank for this question. From the remaining surveys, methods to prepare teachers for the block schedule included: CRISS training, pacing guides, transitions, visits to other schools, how to include variety within the block, Quality Tools training, Academically Gifted training, and book studies.

From the focus group interviews, comments included:

No one prepared us for it. We went through some stuff in a book…

We had a few workshops but I didn’t think they were helpful…they threw you in, you just had to learn to swim.

I don’t remember getting staff development.

However, even with the staff development, some teachers believed that the best way to learn to teach on the block was through trial and error.

I don’t think there really is any way to prepare for the block. You just have to get into it and have to learn on the job, on-the-job training. I know that my first year on the block was nowhere near as clear as my second year on the block. You just take your course into new territory and run with it. I feel much better now in my third year than I did my first year. They can give you all sorts of tips…workshops whatever…planning is one thing but execution is another.

Wake County had launched two initiatives to support teachers with the transition to the block schedule. In 2004-05, teachers in high schools implemented teacher practices based on meta-analysis research from Robert Marzano. From the survey results, when asked to rate the statement, “The district-wide Marzano training initiative helped me to become a better teacher,” 46% of science teachers disagreed, while 48% responded neutrally. The second initiative began in 2005 and has
continued to present. This included encouraging teachers to work in teams as Professional Learning Communities/Teams (PLC’s, now PLT’s). When asked to rate the statement, “The district-wide Professional Learning Communities initiative is helping me to become a more successful teacher on the block schedule, 34% disagreed, while 32% agreed. Finally, when teachers were asked to rate the statement, “I could use more staff development on block scheduling,” 44% disagreed, while 32% agreed.

Two areas where years of teaching may play a role in the experience of the block schedule are: (1) many beginning teachers had experienced the block schedule as a student, and (2) with technology innovations in the past 10 years, beginning teachers may be more familiar with technology as an instructional method. For beginning teachers or teachers new to the block schedule, their needs were evident in the areas of pacing and timing, resources, and transitions.

I remember my first month here…I’d be thinking about my teacher education program for my Masters program, do my great closure. Then I’d look up and see the clock had thirty minutes to go and think, what the heck am I going to do now?

The timing was the hardest the first year. Even the pacing guides don’t take everything into account. Yes, you should spend three days on stoichiometry or redox…you are going to spend one or two days on it, then a day to review.

As a beginning teacher…I need materials, I need notes, I need activities, I need direction, I need planning…

90 minutes is a long time for a new teacher. You have to have a variety of activities. You can’t get up there and lecture for 90 minutes all the time.

However, over time, beginning teachers did state that they felt they had
become better teachers because of the block schedule.

I feel like for a first year teacher, when I came in here...after the first year I taught six different classes. After teaching six different classes, I felt like I grew a lot in experience with trying things out in each individual class...being able to change things up and start things over with discipline plans and new ideas I tried out...having an hour and a half planning period...and three classes to grade for every night works pretty good for me. I student taught on the block and I enjoyed it even though I went to school on traditional schedule.

I feel like I can change my classroom management and procedures around faster. It kind of goes along with having new kids, but you can see what worked and what didn’t work. I think this works for new teachers as well.

The veteran teachers described some similarities to the beginning teacher in the first year of implementation in terms of pacing and transitions. However, veterans expressed having a better resiliency because of years experience and resources.

Science was easier than other subjects on the block and not too much of a transition...the first year, I did have those stretch moments...but really, once you went through the course once, and made those adjustments, it kind of came together.

I remember that first semester of that first year, we struggled a little bit with timing...a lot of new teachers went to a block high school...they couldn’t imagine NOT teaching on a block schedule...the hardest thing for me was the adjustment.

Often the success of any reform or change rests on the professional development that accompanies that initiative. In order to have teachers use a variety of methods, a variety of professional development should be offered that meets the needs of the teachers based on years experience. If teachers are to personalize
learning for their students, professional development must be personalized for the teachers in order to develop the skills in methods they lack.

**Recommendations for Future Research**

These results produced many additional research questions:

- With the state testing change (due to budget), how will Chemistry and Physics teachers’ block schedule experience change without the End-of-Course exam?

- As science teachers are given time to collaborate, what impact will planning with teachers of different experience levels have on instructional methods used?

- One limitation on the survey was not asking science teachers about their use of videos in the classroom. How would teachers rate their use of videos as an instructional method with the block schedule?

- Another limitation on the survey was not adequately defining the type of methods. For instance, what is a lab versus an activity? If the categories were more defined, would this play a role in the responses?

- With the change to the block, for those teachers who have not changed their methods to more student-centered approaches, does this contribute to the drop out rate as schools become boring for kids?

- Do End-of-Course tests combined with the block schedule drive teacher creativity from the classroom?

- What is the role of intervention programs for lower-level students on the block schedule?

- Do students of teachers who pair math with science courses perform better than students who take these subjects separately?

- Have advanced science course (Physics, AP Physics, AP Chemistry) enrollments changed since the implementation of the block schedule?

- How many North Carolina schools have remained on the block schedule since its beginning? Why did schools return to the traditional schedule?

- What is the role of teacher retention and the block schedule?
• How would this data be different if Wake County had more teachers using the A/B schedule?

• Will the block experience change for teachers with the new Essential Standards that are currently being developed?

**Concluding Remarks**

After having completed this research, the researcher sought for a way to combine the essence of the experience science teachers have with the block schedule. Figure 5.1 is the graphic organizer that arose from the data collected. In the center-lies *Instruction*, which is affected by the amount of lecture, labs/inquiry, transitions, review, assessment choices, and enrichment. *Above Instruction*, lies *Professional Development*, which is needed to improve *Instruction*. *Professional Development* for the block schedule takes a different form for beginning teachers (who need assistance with pacing, resources, and being flexible) versus veterans (who need assistance with catching up with technology). *Instruction* is impacted by *Subject Area Differences* (math-based science courses are affected by math issues, and End-of-Course versus Non-End of course differences), as well as the *Type of Schedule* (pacing, flexibility of that schedule, 4 X4 fresh start vs. A/B have students year-long). *Instruction* is also impacted by the *Student Type* (Honors, Academic, Freshman, Non-Freshmen, Advanced Placement, or Special Education), how *Accountable* those students are (Sense of Urgency, Absences, Grading, and Homework Completion), and the amount of *Resources* (such as the media center, class books, class size, class space, copies, paper, materials, equipment, and substitutes) a teacher has access to.
Student Accountability is also affected by the Type of Student, in addition to Resources in the sense of needing more paper when students will not turn in non-graded assignments, and in some situations, access to substitutes (if the teacher has a bad class, the sub will not take the job). Teachers with lower-level students also need to make more copies when papers are lost by students, for special education purposes, when textbooks are misplaced or materials are damaged, etc. Finally, the teachers’ Planning is affected through covering classes, professional learning communities, and by having fewer preparations at a time. However, it can be impacted by Resources in the form of substitutes, what materials are available to plan with, and class space if the teacher is an itinerant teacher. In the last box, the Final Teacher Preference for the block schedule depends on the curriculum, calendar, instructional preferences, and teacher flexibility. Teacher burn-out may also become an issue when asking teachers to “do more with less.”

Be wise in the use of time. The question in life is not "How much time do we have?" The question is "What shall we do with it?"

~Anna Robertson Brown
Figure 5.1 Science Teachers Block Experience
REFERENCES


Ross, D. L., & Westerlund (2001), J. F. *Block scheduling science: Does it help or hinder?*


APPENDIX A

North Carolina State University IRB Consent

From: Debra A. Paxton, Regulatory Compliance Administrator
North Carolina State University
Institutional Review Board

Date: November 1, 2006

Project Title: Science and Block Scheduling: An Analysis of Teacher Practices in Wake County Schools

IRB#: 290-06-11

Dear Ms. Jones:

The research proposal named above has received administrative review and has been approved as exempt from the policy as outlined in the Code of Federal Regulations (Exemption: 46.101.b.2). Provided that the only participation of the subjects is as described in the proposal narrative, this project is exempt from further review.

NOTE:
1. This committee complies with requirements found in Title 45 part 46 of The Code of Federal Regulations.

For NCSU projects, the Assurance Number is: M1263; the IRB Number is: 01XM.

2. Review de novo of this proposal is necessary if any significant alterations/additions are made.

Please provide a copy of this letter to your faculty sponsor. Thank you.

Sincerely,

Debra Paxton
NCSU IRB
December 18, 2006

Carrie Jones
2911-134 Trailwood Pines Lane
Raleigh, NC 27603

RE: Project No. 603 – Science and Block Scheduling

Dear Ms. Jones:

Your request to conduct research entitled “Science and Block Scheduling” in Wake County Schools has been approved.

Please provide a copy of this approval letter to principals when soliciting their participation. Although this letter constitutes our office’s approval of your study, it does not in any way obligate any school to participate; it is up to them to make that decision. If there are questions about this constraint, please call me at 850-1944.

I look forward to working with you and learning the results of your study. Please remember to send me a summary of your findings once your study is completed.

Sincerely,

[Signature]

Bradley J. McMillen
APPENDIX C

Directions to Science Chairs

1) Enclosed you will find the number of surveys, return envelopes, consent forms, and raffle tickets as you have science teachers.

2) Please distribute one survey to each member of your department, one consent form, and one return envelope. If possible, distribute these items in your monthly Science department meeting. Encourage but do not coerce participation.

3) Distribute the same materials to any Science teachers who do not show, preferably by hand (not placed in their mailboxes).

4) Tell teachers the survey relates to Science and Block Scheduling in Wake County and that their input is important. Every survey is valuable! Responses are anonymous.

5) Inform teachers that a Wake County teacher is conducting this study as part of her dissertation, and Central Office will also be receiving a copy.

6) Inform teachers they are eligible to receive a prize (see your enclosed list) through a raffle. After completing the survey, teachers are to send the Survey in the provided courier envelope and alert the Science chair. The Science chair will provide the participant with a lottery ticket shown below AFTER the teacher returns the consent form:

    Science Raffle Ticket

    Teacher Name: ______________________

    Teacher E-mail: _____________________

7) These tickets will need to be couriered over by the chair or given to Carrie Jones before the May 31st deadline. Winners will be notified in June 2007 by e-mail.

8) Some schools may be selected for follow-up focus group interviews in the 2007-08 school year.

    Thanks ☺
    Carrie Jones
    ncscienceteacher@yahoo.com

200
May 9, 2006

Dear Science Supply Company,

I am a doctoral student in Science Education at NC State University in Raleigh, NC. I am completing my dissertation proposal for Science and the Block Schedule in High Schools. Since the Internal Review Board (IRB) may not approve teachers receiving small cash donations for completing surveys, I am relying on the help of Science Supply Companies’ goodwill to donate a teacher raffle item to my study.

Companies are free to leave their business cards attached to the item, and teachers will know which companies donated items before completing the survey. It is anticipated that in my completed dissertation, the contributing companies will be acknowledged.

If you are interested in contributing an item, you may send it to my school or work address. If you would like a letter to state it was a charitable contribution, I can provide one if needed. No freebie is too big or small.

Thank you,
Carrie Jones

School Address:

Carrie Jones
Science Dept. Chair
Middle Creek H.S.
123 Middle Creek Park Ave.
Apex, NC 27539
APPENDIX E

Survey Raffle Items Received

1. Cordless Microscope – Wards
2. Landfills and the Environment Kit – Wards
3. Passport Temperature Monitor – PASCO
4. Personal Weather Monitor – PASCO
5. Data Studio Lite CD-ROMS – PASCO
6. Bacterial Contamination of Water Kit – Fisher
7. Soil Test Kit – Fisher
8. Soil Thermometer – Fisher
9. Urban Water Test Kit – Fisher
11. Soil Sampling Tube – Fisher
12. Collection of Environmental Activities Manuals (8) – Science House – Mary Louise Bellamy
13. Volumetric Flask – Cyanmar Company
14. Amazing Planet Videos/Tote Bag/Candle – Teacher’s Discovery Store
15. Go! Motion – Vernier
16. Go! Temp – Vernier
17. $50 Gift Certificate – Vernier
18. T-Shirt – Fotodyne
19. Make an Ocean Kit – Kemtec
20. USB Adapter (S-video or Composite Video Signal → digital USB 1.1 signal) – Ken-a-Vision
21. Office Portfolio Organizers (2) – MeadWestvaco
22. NSTA Project Earth Science – Astronomy book
23. Thinking Inside the Block Schedule book
24. Fossil Collection – Ulrich’s
26. Mars Explorer Simulation CD-Rom – Space Explorers
27. Spaceshots Postcards – Spaceshots, Inc.
28. pH Meter (2) – Hanna Instruments
29. Inflatable Animal Cell – National Gardening Association
30. Seashells of NC Book (2) – Teri Kerby Hathaway – Sea Grant
31. Teacher at Sea Book (2) – Teri Kerby Hathaway – Sea Grant
32. The Amazing Oyster DVD (2) – Teri Kerby Hathaway – Sea Grant
33. Calculator Clock – Fisher Scientific
34. Stopwatch (4) – Fisher Scientific
35. IMAX Ticket – Exploris
<table>
<thead>
<tr>
<th></th>
<th>Product Name</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.</td>
<td>pH Meter – Carolina Biological</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Conductivity Meter – Carolina Biological</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>$50 Gift Certificate – Carolina Biological</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>Misc. Teacher Theme/Desk Items – Figurines, Paper Weights, Key chains, Teacher Quote books, Paper clip holder</td>
<td>Carolina Biological</td>
</tr>
<tr>
<td>41.</td>
<td>Misc. Gift baskets</td>
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</tr>
<tr>
<td>42.</td>
<td>TI- Classroom Activities CD-Roms (4)</td>
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</tr>
<tr>
<td>43.</td>
<td>Sep-Up – Science and Life Issues Sample Kit</td>
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<tr>
<td>44.</td>
<td>Teacher Christmas Ornaments (Hallmark) (11)</td>
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<td>45.</td>
<td>Teacher Candle Topper – Hallmark</td>
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<tr>
<td>46.</td>
<td>Teacher T-shirts – Hallmark (4)</td>
<td></td>
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<tr>
<td>47.</td>
<td>Solar Physics – NOAA</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>Cosmic Evolution CD-ROM – NASA</td>
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<tr>
<td>49.</td>
<td>Mars Education CD-ROM – NASA</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>Chandra X-Ray Observatory CD-ROM- NASA</td>
<td></td>
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<tr>
<td>52.</td>
<td>Student Activities in Meteorology CD-ROM</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>Mixed Reception (Intro Chemistry) CD-ROM – Carnegie Mellon</td>
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<tr>
<td>55.</td>
<td>Understanding Models in Earth and Space Science (2) – NSTA</td>
<td></td>
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<tr>
<td>56.</td>
<td>DNA: The Secret of Life DVD – Morehead Planetarium</td>
<td></td>
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<tr>
<td>57.</td>
<td>Starry Night Software – Imaginova</td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>Suited for Spacewalking Curriculum –NASA</td>
<td></td>
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<tr>
<td>59.</td>
<td>Dedicated to Service – A Career in Vet Medicine (VHS) –World Placement Video</td>
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</tr>
<tr>
<td>60.</td>
<td>Rabies Video – World Placement Video</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX F

Block Scheduling Survey

Directions: Please answer the following questions related to Science and Block Scheduling and return to Carrie Jones, (Science Chair) at Middle Creek High School. Use the pre-labeled envelope and send via courier mail so that your responses remain anonymous. Your input is very important!

**All teachers who return this survey are eligible for a free Science equipment or teacher item raffle ticket and WILL receive a prize.**

Let your Science chair know when you have returned the survey to Carrie Jones, and he/she will give you your raffle ticket. Teachers will receive prizes by the end of the 2006-07 school year.

All surveys are due by March 30, 2007!

Part A: Demographics

1. How many years (including this one) have you been a Science teacher? ______

2. How many years (including this one) have you taught Science in Wake County? ______

3. I am a (circle) : Traditionally Licensed OR Lateral Entry teacher.

4. I completed my pre-service teacher education training (circle):

   In North Carolina OR Out-of-State

5. Did you receive any instruction for teaching 90 minute lessons in your pre-service teacher education program?

   YES OR NO

6. Before block scheduling, I had (estimate):

   #_____ Students #_____ Course Preparations

   _____ Not Applicable: Block Scheduling is the only schedule-type I have taught on
After block scheduling, I have (estimate)
#_____ Students  #_____ Course Preparations

7. My gender is:  MALE  OR  FEMALE

8. Describe any training you experienced in your pre-service teacher education that prepared you for teaching on the block schedule.

9. Describe any staff development your school experienced when transitioning to or in maintaining the block schedule.

10. The two primary course(s) I teach are: ______________
________________

(Please fill these in on the table on pages 2, 3, and 4)
Part B. Teacher Opinions

Use the following Scale to answer each question:

1= Strongly Disagree  2= Disagree  3=No Opinion  4=Agree  5= Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Course (fill in):</th>
<th>Course (fill in):</th>
</tr>
</thead>
<tbody>
<tr>
<td>I spend more time on paperwork with block scheduling than on the traditional 50 minute period</td>
<td>SD 1 2 3 4 5</td>
<td>SD 1 2 3 4 5</td>
</tr>
<tr>
<td>I find it difficult to teach the Standard Course of Study in the allocated time</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Under block scheduling I have more time for my students</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>There was nothing wrong with the old schedule so I do not know why we had to change it</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>I spend more time planning for classes with block scheduling</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>I believe block scheduling is a better way to organize school time</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
90 minutes per period is the right amount of time for my subject.

I use time more efficiently on the block schedule.

Under block scheduling I have more time for my students.

It is difficult to plan for 90 minutes compared to planning for 50 minutes.

I assign more work since implementing block scheduling.

I restructured my lesson plans when we changed to block scheduling.

Instructional pacing is easier on block scheduling compared to the 50 minute period.

I worry I have too much material to present with the block schedule.
The state curriculum needs to be revised to accommodate block schedules

I do not have adequate instructional materials to teach on the block schedule

I have adequate laboratory materials to teach on the block schedule

I have implemented new teaching strategies on the block schedule

I am comfortable with my instructional practices since we implemented block scheduling

I include more of a variety of assessments since the implementation of block scheduling

The district-wide Marzano training initiative in 2004-05 helped me to be a more successful teacher on block scheduling
The district-wide *Professional Learning Communities* Initiative in 2005-07 is helping me to become a more successful teacher on block scheduling.

I collaborate more with colleagues on block schedule.

The student to teacher ratio has increased in one or more classes on block scheduling.

I have difficulty maintaining student interest on the block schedule.

Students are more successful on the block schedule.

There have been more discipline problems in my classes since changing to block scheduling.

My stress level has increased since changing to the block schedule.
<table>
<thead>
<tr>
<th>I think that I am adequately trained to teach on the block schedule</th>
<th>1 2 3 4 5</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I could use more staff development on block scheduling</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>I would like to maintain the block schedule</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
### Part C: Instructional Methods Used on the Block Schedule

Use the following Scale to answer each question:

1= Strongly Disagree  2= Disagree  3=No Opinion  4=Agree  5= Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Course (fill in):</th>
<th>Course (fill in):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since moving to the block schedule I use more:</td>
<td>SD    D    N    A  SA</td>
<td>SD    D    N    A  SA</td>
</tr>
<tr>
<td>Team Teaching</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Role-Playing</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Cooperative Learning</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Long Term Projects</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Socratic Seminars (Paidiea)</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Lectures</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Group Discussions</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Performance Assessments</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Silent Reading in Class</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Labs</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Projects</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Technology (Computers, Calculators, etc)</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Guest Speakers</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Field Trips</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Media Center Visits</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Homework Assigning during class time</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Outdoor Activities</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Teacher Demonstration</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Activities</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Simulations</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Problem-Based Learning</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Individual Seatwork</td>
<td>1 2 3 4 5</td>
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</tr>
<tr>
<td>My teaching methods did not change</td>
<td>1 2 3 4 5</td>
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<tr>
<td>Other (please specify):</td>
<td>1 2 3 4 5</td>
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</tr>
<tr>
<td>Other (please specify):</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
Part D: Short Answer Opinions

1. What is working well for you (benefits) with block scheduling?

2. What is not working well for you (drawbacks) with block scheduling?

3. What suggestions do you have for improving the block schedule?

4. Please describe how you typically use your 90-minute planning period (planning, grading, professional development, relaxing, etc)
5. How have your instructional methods changed since implementing the block schedule?

6. What is your current opinion of block scheduling as it relates to:

   *Instruction*:

   *School Climate*:

   *Time*:

   *Materials*:

7. What are your current needs to maintain successful continuance of the block schedule?

8. How have your teaching experiences changed over the past 3-4 years with the implementation of the block schedule?
APPENDIX G

Moderator Guide

*Moderator Preparation*: Food, Room Set-Up, Recording Equipment, Index Cards, Name Tags, Markers, Prizes

Overview:
- Intro – Intro and background, General Purpose, Use of Data, Anonymity
- Warm-up Period – Survey Results
- Writing Period – “On the index card…”
- Question Period – “What are your impressions of…”
- Summary – Clarify and Summarize
- Thank you and wrap up – Thank you, Anonymity reminder

*Moderator Opening Remarks*:

1) Thank you for participating
2) Description of refreshments, restroom, movement
3) Introduction of the research, why you were selected, appreciate their time, valuable input, purpose – to determine their ideas about block scheduling.
4) Description of the recording instruments
5) Definition of block scheduling and purpose of a focus group.
6) Moderator is neutral, no particular order, speak one at a time, consensus is not necessarily the goal
7) No wrong answers
8) Type of information wanted
9) Sign Confidentiality Agreement (explain how data will be used), Nametags
10) Introduction of Participants
11) Index Cards – Initials, Years Teaching, Background, Subjects Taught (Side A) -What does a successful teacher look like on the block schedule (Side B)?

*Non-threatening Questions*:

1) What are some of the reasons why teachers have such a mixed opinion about block scheduling?
2) Thinking back: What was your school day like before block scheduling compared to now? Your year?

3) How did you initially react to the idea of block scheduling?

4) Was your preparation for block adequate?

**Main Questions:**

5) Describe the three most significant benefits that are related to block scheduling.

6) Describe the three most significant drawbacks that are related to block scheduling.

7) What suggestions do you have for minimizing these drawbacks?
8) How have your instructional methods changed since block scheduling was implemented?

9) What are your needs at this point?

10) How has your teaching experienced changed since the block was implemented?

11) What is your Opinion of the Block as it relates to:
    a) Time
    b) School Climate
c) Materials

d) Instruction

12) Share data from survey and ask for clarification:

13) Do you feel that the block schedule for all students? All subjects? All grade levels?

14) What are the needs of the Master Teacher on block? The ILT on block? The EOC teacher on Block? The Non-EOC teacher on block?

Facilitation cues: (Vaughn 1996)

1) Now let’s talk about…

2) What do you think about…

3) May I ask…

4) What do you like about…

5) How do you feel about…
6) Why?

7) Ask for clarification, details, (allow silence),

   Let’s go back to discussing…
   Describe this experience…

   Explain what you mean by…

   Can you give an example of…

   Would you all agree with that?
   I see you are nodding

**Quiet People:**

1) I noticed you ___ when ______.

2) Do a Round Robin…

3) Thank you very much. ___ would you go next?

**Dominating People:**

1) Putting hand in stop position
2) No eye contact
3) Pat individual’s arm
4) Summarize their responses
5) Remind them tape can’t distinguish separate responses

**Encouragement:**

This group is going very well!

**Summarizing:**

1) What I am hearing you say then, is that you ___. Is that what you are all saying?

2) Do you have other comments about the block schedule that I have not given you an opportunity to mention?
Wrap up: Unfortunately we are running out of time. Let me attempt to summarize the main ideas. First ___. Second___, Third___

Member Check: Let me identify some key discussion points and then I would like to check off how you feel about them by asking each one of you. First, how many of you feel ___

Closing Statement: As we come to a close, I need to remind you that the audiotape will be transcribed, you will be assigned false names and then the tape destroyed. I ask that you refrain from discussing the comments of group members and that you respect the right of each member to remain anonymous. Are there any questions I can answer?

Thank you for your contribution to this project. Your involvement is appreciated.
APPENDIX H

Focus Group Informed Consent

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Science and Block Scheduling: An Analysis of Teaching Practices in Wake County High Schools

Principal Investigator: Carrie Jones Faculty Sponsor: John Park (Science Ed.)

We are asking you to participate in a research study. The purpose of this study is to gather information about teachers’ opinions of Block Scheduling and the effects it has on teachers’ practices.

INFORMATION
If you agree to participate in this study, you will be asked to:

Meet for a one-time focus group interview with your fellow teachers to discuss Science and Block Scheduling. The researcher will come to your place of employment for convenience to you. The total time (including a brief reception) will be < 90 minutes.

RISKS
The focus group interview will be audio-taped. On the transcript, teacher names will be changed. After the tape has been transcribed, the tape will be destroyed, so there will be no way to link your responses to your name.

BENEFITS
Your participation is expected to contribute to knowledge specific to Science and Block Scheduling in Wake County. A copy of the final report will be given to Central Office/Evaluation and Research so that they may hear teacher concerns.

CONFIDENTIALITY
The information in the study records will be kept strictly confidential. Data will be stored securely in a lock box in the researcher’s home. No reference will be made in oral or written reports which could link you to the study.

COMPENSATION
For participating in this study you will receive a Lunch/Light dinner, along with a small (non-monetary) token of appreciation for participants’ time.

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, Carrie Jones, at 123 Middle Creek Park Ave; Apex, NC 27539, or 919-601-1226. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr.
PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed at your request. Participation has no bearing on your job performance and will not be used in an evaluative capacity.

CONSENT
“I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may withdraw at any time.”

Subject's signature_______________________________________ Date _________________

Investigator's signature____________________________________ Date _______________
APPENDIX I

Researcher Perspective

As a researcher engaged in qualitative research, I think it necessary to share my background and perspectives. I attended K-12 neighborhood schools from 1980-1993. The high school I attended was on a six-period day, with students taking four core classes and two electives. After high school, I completed my B.S. in Biology in 1998 and M.Ed. at Ohio State University in 1999. I moved to North Carolina and taught eighth-grade science (on traditional seven periods with a year-round calendar) in Fayetteville, NC because of their need for teachers. After this first year teaching, I moved to Raleigh, NC in order to go back to taking college classes. I worked at Centennial Campus Middle, teaching seventh- and eighth-grade math and science on a modified year-round calendar with math/English meeting everyday for 90 minutes and science/social studies meeting every other day for 90 minutes. I moved to the high school level in 2002-03, when Middle Creek High School opened on a traditional schedule. This school was the first high school to pilot the 4X4 block, and other Wake County high schools followed in 2003-04. While I have never had a personal preference for schedule-type because there are advantages and disadvantages with both types, I came to believe there was a difference in teaching methods the first time I taught an End-of-Course test (Biology), after having taught Earth Science, with a Non-End-of-Course test. I found that on block schedule with the End-of-
Course test, I ran out of time and I stuck to teaching mostly traditional methods (lecture and labs), whereas in my Earth Science classes, I would venture out and experiment more with alternative assessments, group work, projects, research, etc. because I was not bound to the “drill and kill” methods needed to help students pass trivial tests. I also encountered teachers at workshops who had definite opinions one way or the other. For instance, once I was standing outside of a room waiting to present at the North Carolina Science Teachers Association. A gentleman who taught Physics asked me what my topic was, which happened to be *Instructional Strategies on the Block*, and he went into a tirade of negativity about the block such that I was shocked someone could hate something so much. He went as far as threatening to retire if his county did not go back to traditional schedule. While I do not believe the animosity is so great today, I was curious to see what the results would generate and how teachers have dealt with block scheduling over the past four years.

As a teacher in the classroom, I am a firm believer that daily instructional pacing and variety in teaching methods are both possible and necessary when teaching on a block schedule. With the longer periods of time and the low teenage attention span, frequent transitions—along with teaching in a progression from more to less structure in a lesson—promotes the best success in classroom management and student learning. If students can predict the mode of instructional delivery and activities for the 90 minutes when they first walk in the
door, this is an indicator to me I need to work harder on varying my instructional methods. In order to be effective on block scheduling, teachers should master five to ten instructional methods and not be afraid to experiment with new instructional strategies. Integration, learning styles, multiple intelligences, and technology are very easily adaptable to block scheduling, and easily engage students when used often in the classroom.
APPENDIX J

Teachers Participating in Focus Group Interviews

Interview #1

Participants:

Wendy* – Earth Science, 15th year

Courtney* – Biology/Earth Science, 10th year

Keith* – Physics/Biology/Anatomy/Earth, 13th year

Bill* – All Chemistry, 23rd year

Justin* – Physical Science, 4th year

Tim* – Math /Science, 18th year

Sam* – Physics, 10th year

School*: Southside High (4X4 Schedule)

Location : Classroom – Individual desks faced each other

Time: 2:45-3:45

* Names and School Names were changed to protect anonymity
Interview #2

Participants:

Tom* – AP Biology, 24 years
Kate* – Biology/Anatomy, 14 years
Liz* – Earth Science, 5 years
Kim* – Chemistry, 25 years
Ellen* – Biology, 25 years
Brian* – Physical Science/Forensics, 5 years
James* – Physics, 21 years
Rich* – Earth Science, 8 years
Lauren* – Biology/Anatomy, 8 years
Ann* – Biology/Earth Science, 9 years
Liz* – Earth Science, 6 years
Sue* – Chemistry/AP Chemistry, 37 years

School*: Northern High (4X4 Schedule)

Location: Classroom – Tables, faced each other

* Names and School Names were changed to protect anonymity
Interview #3

Participants:

Tori* – Biology/Earth Science, 7 years

April* – Biology/Marine Ecology, 5 years

Barbara* – Earth Science/Biology/Horticulture, 4 years

Aaron* – Physics/AP Physics, 1 year

Rita* – Chemistry/Physical Science/Earth Science, 7 years

Rose* – Biology, 7 years

Jared* – Biology/Earth Science, 5 years

Valerie* – Biology/Anatomy/Earth Science, 5 years

Nicole* – Biology/Zoology, 8 years

Darren* – AP Environmental/AP Biology/Biotechnology, 31 years

School*: Eastern High (4X4 Schedule)

Location: Classroom – Tables, faced each other

* Names and School Names were changed to protect anonymity
Interview #4

Participants:

Cheryl* – Earth Science, 2 years

Trina* – Biology, 10 years

Jenna* – Biology/AP Biology, 11 years

Alice* – Biology, 1 year

Breanna* – Physical Science/Earth Science, 4 years

Nancy* – Chemistry/Forensics, 2 years

Chris* – AP Environmental/Marine Ecology, 12 years

Seth* – Earth Science, 5 years

School*: Westview High (4X4 Schedule)

Location: Classroom – Tables, faced each other

Time: 12:45-2:15 PM – Teacher Workday

* Names and School Names were changed to protect anonymity
Interview #5

Participants:

Calvin* – Earth Science, 9 years
Casey* – Biology/Earth Science/Physical Science, 30 years
Shirley* – Biology, 9 years
Justine* – Biology/AP Biology, 8 years
Dana* – Biology/Earth Science, 7 years
Krystle* – Chemistry, 3 years
Tammy* – Chemistry/AP Chemistry, 9 years
Kami* – Earth Science/Biology, 11 years
Denise* – Biology/Anatomy, 4 years
Judy* – Biology/Forensics, 2 years
Phillip* – Physics/Physical Science, 2 years

School*: North Eastview High (4X4 Schedule)

Location: Classroom – Individual desks faced each other – classroom was warm-A/C out

* Names and School Names were changed to protect anonymity
Interview #6

Participants:

*Lynn* – Physical Science/Chemistry/AP Chemistry, 6 years

*Don* – Physics/AP Physics, 33 years

*Kelsey* – Biology, 11 years

*Mike* – Physical Science, 2 years

*Aerial* – Chemistry, 1 year

*Daisy* – Earth Science, 4 years

*Morgan* – Biology, 4 years

*Cathy* – Earth Science, 3 years

*Lindsay* – Biology, 17 years

School*: Northeastern High (4X4 Schedule)

Location: Classroom – Individual tables faced front, teachers turned towards one another

*Names and School Names were changed to protect anonymity
Interview #7

Participants:

Jason* – Biology/AP Biology/Astronomy, 9 years

Sandra* – Biology, 6 years

Kyle* – Earth Science, 4 years

Celine* – Biology/AP Biology/Anatomy/Marine Ecology, 33 years

Curtis* – Biology/AP Chemistry/Physical Science, 12 years

School*: South Westerville High (4X4 Schedule)

Location: Teachers Lounge, Teachers faced each other at same table

Time: 2:50-3:50

* Names and School Names were changed to protect anonymity
Interview #8

Participants:

*Maggie* – Chemistry/Earth Science, 13 years

*Leigh* – Biology/AP Biology, 22 years

*Kendra* – Earth Science/Physical Science, 4 years

*Nathan* – Chemistry/Physical Science/Earth Science, 4 years

*Heidi* – Physics/Physical Science/AP Physics, 33 years

*Edgar* – Earth Science/Physical Science, 4 years

*Pamela* – AP Chemistry/Chemistry/Forensics, 12 years

*Derek* – AP Environmental/Anatomy, 17 years

School*: Central High (A/B Schedule)

Location: Teacher classroom with individual desks, circled, facing each other

Time: 1:30-2:30 PM – after a final exam

* Names and School Names were changed to protect anonymity