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## **Middle Level Teachers' Perceptions of the Impact of Block Scheduling on Instruction and Learning**

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### **Abstract**

Middle level teachers who implemented a 4 X 4 semester block schedule were interviewed to determine their perceptions of the effects on instructional strategies and curricular decision making. Ten teachers from two middle level schools in the mid-Atlantic region of the United States were interviewed. Respondents report the use of more active instructional strategies. The majority of respondents believe that the amount of curricula studied must be altered to adjust to this alternative scheduling format. Teachers believe that young adolescents' learning is positively influenced by block scheduling. The 4 X 4 semester block schedule was not found to promote the development of interdisciplinary studies or teacher teaming.

### **Introduction**

"Learning is problem solving, working in groups. It means to communicate successfully with someone and to have time to reflect on information you've learned" (Judy, 7th grade mathematics teacher). Judy's ideas about learning reflect the beliefs of many classroom teachers and educational researchers (Brown & Rose, 1995; D'Arcangelo, 1998) ["Judy" is a pseudonym for a respondent to this study]. Recent cognitive research has led to a prominent focus on students' learning needs and how those needs should impact teachers' instructional practices (Cobb & Mayer, 2000; D'Arcangelo, 1998; Jensen, 1998; Tomlinson, 1999). Unfortunately, many junior high schools and those middle schools that have not altered the structure of the traditional factory model school day of six to seven, 40-55 minute periods are not meeting the learning needs of young adolescents. Many middle level students need more time for problem solving, collaborative learning, and reflection for meaningful learning to occur based on their cognitive developmental levels (Lounsbury & Clark, 1990; Piaget, 1977). Elementary teachers generally have more flexibility than middle or high school teachers to appropriately design learning environments that respond to children's cognitive and social needs. Picture an elementary school day and how its structure and design provide for a variety of meaningful learning experiences for children:

- extended blocks of flexible learning time;
- teacher autonomy to determine lesson length;
- heterogeneously grouped classes;
- extended time frames to encourage integrated curriculum studies; and,
- acceptance and expectation by peers, administrators, and parents to design and implement constructivist approaches to learning.

Contrast the elementary school approach to instructional practices and curricular decision making with a traditionally designed junior high school:

- 40 to 55 minute periods;
- homogeneously grouped classes for mathematics and literacy courses;
- single-subject designed courses and curriculum delivery; and,
- a fast-paced instructional process to encourage covering as many topics as possible each academic year.

The clear advantage for designing an appropriate learning environment goes to the elementary classroom teacher if one considers the research on how learning occurs. Authors of the 1983 National Commission on Excellence in Education report, *A Nation at Risk*, expressed concerns about how time was used in schools. Following that report, ideas such as increasing the length of the school day or the school year were suggested in order to increase student productivity. Teachers or administrators did not readily accept these suggestions. Existing research was not available to support an extended school year or day as effective strategies for improving student learning (Canady & Rettig, 1995). The 1980s saw a surprising addition of more periods to the school day in many secondary schools, as students were required to take more courses (Canady & Rettig). Other solutions were needed to create a more flexible time arrangement for secondary schools to meet the needs of both teachers and students. Alternative scheduling strategies became the means for addressing students' learning needs based on the multitude of cognitive research released at the time. Reformers, however, faced one particularly significant barrier: the public's affinity for the traditional factory model of schooling structure, which relies on 40 to 55 minute separate subject area periods. One guiding philosophy that provided support for creating alternative scheduling structures in secondary schools emanated from Ted Sizer's (1992) suggestions in the early 1990s. Sizer's thoughts on the need for extended class sessions to promote greater student understanding and his contention that secondary teachers should be responsible for educating only a maximum of 80 students a year instead of the usual 150 provided the impetus for structural change. Hackman and Valentine (1998) provide additional reasons for altering schedules, particularly at the middle school level:

- support for interdisciplinary team organization;
- an appropriate structure for the delivery of meaningful learning experiences; support for the use of active instructional strategies through expanded and flexible use of time; opportunities for the development of meaningful relationships between teachers and students; and,
- to promote teacher empowerment and collaboration (Hackman & Valentine, 1998).

More practical guidance for scheduling changes occurred in the mid-1990s when a reintroduction of flexible scheduling models from Carroll (1994), Edwards (1995), and Canady and Rettig (1995) were published. Flexible scheduling is defined as a restructuring of the school day from an equal number of minutes in six, seven, or eight periods to an alternative format providing for substantially longer periods and a variety of learning time frames (Bevevino, Snodgrass, Adams, & Dengel, 1999). Block scheduling is a commonly used term to describe an alternative scheduling format and is defined as the arrangement of a school's schedule into longer (generally more than 60 minutes) and more flexible time frames than the traditional 40-55 minute period (Canady & Rettig, 1995). Block scheduling is usually described in three formats: the 4 X 4 semester block, alternating-day block, and flexible interdisciplinary block. Each one is generally designed into fixed extended periods of 80 to 90 minutes. The 4 X 4 semester block format provides students with eight classes a year; four each semester. The alternating-day block schedule provides students with as many as eight classes all year that meet on alternating days of the week. The flexible interdisciplinary block can be designed in several ways to provide students with as much as three-hour blocks of time to engage in interdisciplinary study of several subject areas and/or thematic studies. A number of authors have used the terms block scheduling, flexible scheduling, alternative scheduling, and intensive scheduling interchangeably (Bevevino et al., 1999; Canady & Rettig, 1995; Hackman & Valentine, 1998). Another alternative scheduling format is the Copernican Plan schedule which utilizes extended periods (i.e., over 60 minutes) with several possibilities for the number of days that courses meet: either in trimesters, quarters, or perhaps in as few as 30 or 60 day formats (Canady & Rettig). A reasonable percentage of high schools altered their scheduling structure by the mid-1990s despite years of using the traditional 40 to 55 minute periods (Cawelti, 1994). Cawelti's study indicated as many as 39% of the

nation's high school faculties and administrators planned to implement block scheduling within the year. Administrators were armed with support to alter scheduling formats from research on topics such as strategies for brain-based learning (Caine and Caine, 1994), the value of developing interdisciplinary curriculum (Jacobs, 1989), multiple intelligence theories (Gardner, 1983), and techniques for teaching for thinking (Resnick & Klopfer, 1989). Few middle schools at the time, however, adopted this type of scheduling change as it is reported that 94% of middle schools continued to use a six-to-eight period day (Valentine, Clark, Irvin, Keefe, & Melton, 1993). One study reported a greater use of alternative scheduling at the middle level as researchers reported that 40 percent of sixth and seventh grade classrooms and 27 percent of eighth grades had implemented flexible scheduling formats to promote integrated curriculum studies by the mid-1990s (McEwin, Dickinson, & Jenkins, 1996). This researcher discovered that two local middle schools adopted the 4 x 4 semester block scheduling format that matched their local high schools' scheduling structure. The 4 X 4 semester block schedule provides students with eight core classes a year-four each semester. Each class session lasts for approximately 80 to 90 minutes and curriculum and instruction is provided in a single subject area format rather than interdisciplinary. The researcher's questions about the ability of a scheduling change to impact teachers' instructional behaviors or to improve students' learning led to the initiation of this study. The researcher also wanted to determine if teachers' perceptions of learning, as indicated by remarks such as Judy's, would be reflected in their beliefs and actions as a result of implementing an alternative scheduling format.

## **Background**

"We predict that the single most important factor in determining the success or failure of block scheduling programs will be the degree to which teachers successfully alter instruction to utilize extended time blocks effectively" (Canady & Rettig, 1995, p. 22). Rigid schedules of seven to nine 40 to 55 minute periods have existed in the majority of middle grades and high schools for approximately 80 years. A more flexible plan was introduced by Trump called flexible modular scheduling and adopted by 15 percent of high schools in the late 1960s (Goldman, 1983). Manlove and Beggs (1965) proclaimed in their proposal for a more flexible schedule a meaningful reason to change: "There is a need for the school to be organized to encourage students to be involved and active in the learning process, to allow teachers...to vary the pace and the content of instruction for each student" (p. 19). As the 1960s became the 1980s, few events occurred to alter the traditional factory model of schooling structures that supported the seven to nine separate-subject period day in middle and high schools. O'Neil (1995) reported that a mere 15 percent of secondary schools briefly attempted flexible scheduling formats during the 1960s and 70s. Education in the early 1980s was dominated by a focus on teaching the basics, and innovative school restructuring efforts suffered as high stakes testing influenced educational policy and practice (Airasian & Madaus, 1983). A focus on teaching for thinking influenced the late 1980s and was an encouragement for schools to seek alternative scheduling formats to provide students with opportunities for more meaningful investigations of curricula to increase the development of students' thinking processes (McTighe & Schollenberger, 1985). Many high schools did change scheduling formats during the 1990s. Zepeda (1999) reported that as many as half of the high schools across the nation adopted flexible scheduling formats in efforts to improve learning and teaching. Much of the research on alternative scheduling formats (i.e., block, flexible, intensive) indicates positive effects on student learning and teacher instructional processes (Dow & George, 1998; Fogerty, 1996; Shortt & Thayer, 1999). Most research in the area of alternative scheduling exists from studies conducted at the high school level; therefore, this review will provide data primarily reported from high schools. Few studies on the implementation and impact of alternative scheduling at the middle school level exist. One of the most widely adopted scheduling changes that has occurred is the implementation of the block schedule. The daily schedule is organized into larger blocks of time for learning (more than 60 minutes) under this arrangement. Several models of block scheduling exist, however, this study focused on the 4 x 4 semester plan in which students enroll in four courses each semester. Each class meets for approximately 90 minutes a day, but for only one semester of the academic year.

## **Effects on Instruction**

Queen, Algozzine, and Eaddy (1998) in studying the implementation of the 4 x 4 semester block schedule in three high schools noted the following positive aspects as identified by teachers:

1. instructional flexibility
2. longer planning periods
3. more time for in-depth study of content

Department chairs and other administrators in one high school noted teachers use of more cooperative learning, wider use of computer and other technologies, more simulation activities, and more student-directed projects after the school adopted block scheduling (Reither, 1999). Staunton and Adams (1997) discovered that a set of California high school teachers believed block scheduling provided opportunities to experiment with new instructional strategies. Shortt and Thayer (1999) noted a greater emphasis by teachers on altering instruction based on students' needs as a result of longer class periods in several Virginia high schools. Two researchers in an in-depth study of one high school found that the teachers' roles, "... shifted from director of learning in lectures to facilitator of learning when working with small groups," when they moved to block scheduling (Salvaterra & Adams, 1995, p. 34). All of these findings accentuate the changes that teachers made in instructional behaviors as a result of moving to a block scheduling format.

## **Effects on Student Learning**

Many educators and the public believe that altering teacher instructional behaviors will concurrently improve student learning. Dow and George (1998) noted a number of improvements in student achievement when they studied Florida high schools that had moved to block scheduling. One school's faculty reported the following student gains:

1. a rise of 33 percent in the number of honor roll students
2. an increase in grade point average by all students
3. half the number of discipline referrals from the previous year
4. students moving from the middle school to the high school maintained acceptable grade point averages.

Shortt and Thayer (1999) reported slightly greater gains in mathematics and reading scores on norm-referenced tests for students enrolled in block scheduling formats over students enrolled in traditional scheduling formats in comparison at 279 Virginia high schools. Reither (1999) also found in a New Jersey high school that the number of students on the honor roll doubled after teachers began using block scheduling.

### ***Perceived Disadvantages***

Much of the literature review indicates positive teacher and administrative support for block scheduling formats. Two of four high schools examined in one study, though, initiated block scheduling for a couple of years then dropped that structure to return to the traditional 40 to 55 minute period due to teacher dissatisfaction (Adams & Salvaterra, 1998). Teachers are concerned that students may be receiving less content as a result of moving to block scheduling formats (Hackman & Waters, 1998; Salvaterra & Adams, 1995). Teachers also reported more time needed for planning as a result of moving to the block (Swope, Fritz, & Goins, 1998; Santos & Rettig, 1999).

## **Middle Level Implementation**

All of the data presented above represent findings from high schools that have adopted block scheduling-not middle schools. Valentine and associates (1993) conducted a national survey in 1993 and reported that 94 percent of middle schools utilized the more traditional six-to-eight period day. McEwin and associates (1996) reported increases in the number of middle schools implementing flexible scheduling models from 1988 until

1993 with increases from 7 to 15 percent depending on the grade level (i.e., a higher percentage of changes occurred at the sixth and seventh grade than the eighth grade). Data collection on the number of middle schools that have adopted alternative scheduling formats since 1993 has not occurred. Valentine and Whitaker (1997) describe flexible interdisciplinary block scheduling as "A trademark of middle level education," (p. 280) despite the absence of available statistics on its current use. Similar positive effects of implementing flexible block scheduling were reported at the middle school level as were reported at high schools (DeRouen, 1998; Gallagher, 1999; Smith, Pitkin, & Rettig, 1998). The middle schools these researchers studied used a more flexible schedule than the 4 x 4 semester block model that utilizes consistent 80 to 90 minute periods taught in a single subject instructional approach (i.e., no interdisciplinary studies). The flexible interdisciplinary block schedule is suggested as the most appropriate model for middle level schools (Hackmann & Valentine, 1998). In the flexible interdisciplinary schedule, teams of teachers are provided with large blocks of time that they may arrange into any configuration each day based on the type of interdisciplinary planning and learning in which students are engaged. Other advantages of using a flexible model at the middle school level include opportunities to

- develop meaningful relationships with students;
- utilize more flexibility in instructional processes due to larger time blocks;
- increase teacher collaboration and planning;
- more effectively address the learning demands of students with special needs;
- increase student understanding through more in-depth study of curricula;
- empower teachers with additional responsibilities for curricular design; and,
- effectively support heterogeneous grouping (Hackman & Valentine, 1998; Nolan, 1998; Seed, 1998).

Seed (1998) reported that middle level teachers in one building using flexible block scheduling designed more active learning experiences for students than when they only had 42 minute class periods. DeRouen (1998) noted that middle level students were exposed to more in-depth study of topics and more creative lessons when one middle school moved to a block schedule. Smith and associates (1998) reported improvements in students' behavior as a result of a middle school in Virginia moving to flexible block scheduling. Some middle level advocates discourage implementing the 4 x 4 block scheduling format despite positive results obtained from many high schools. Hackman and Valentine (1998) warned, "Copernican and 4 x 4 block schedules may provide numerous advantages for high schools, but they possess a serious flaw that makes them very problematic for implementation at the middle level ...." (p. 8) specifically citing the difficulties of developing interdisciplinary units when teachers are isolated as in the 4 x 4 block scheduling format.

## **Curriculum Models**

National Middle School Association (1995) identified integrative curriculum studies as one of the ten characteristics of developmentally appropriate middle level schools. Curriculum integration design provides for student directed and designed curricula that focus on the questions that young adolescents have about their lives and personal environmental circumstances. Areas of study may include themes such as conflict or the future. Curriculum integration provides for a flexible course of study and time frames throughout the year in which learning outcomes are determined and assessed by students with teacher guidance and support (Beane, 1993). The interdisciplinary approach to curriculum differs from curriculum integration in that curricular content is determined by teachers rather than students (Knowles & Brown, 2000). Interdisciplinary curricular studies involve the development of thematic units such as the study of pollution and its impact on humans that may encompass all subject areas mandated within a school's curriculum. Single subject curricular approaches which are often maintained in a 4 x 4 semester block schedule ignore the need for teachers to meet in teams to develop and implement integrative curriculum or interdisciplinary studies. The two middle level schools' faculties interviewed in this study taught in a 4 X 4 semester block format despite the concerns of middle level researchers. The limitations placed on the ability of teachers to implement an effective middle school curricular design and teaming structure is an additional reason that the researcher chose to study these two middle schools.

## **Methodology**

The "...future success of an intensive time schedule, or any major change, may hinge more on teachers' perceptions of the change than on its actual merits" (Salvaterra & Adams, 1995, p. 35). The author chose qualitative research methods using the interpretist theory (Erickson, 1986) as a guiding philosophy for the study. Researchers working within this paradigm believe that the most accurate means of understanding actions is to consider insider perspectives (Eisenhart & Howe, 1990). Within an interpretist theory study, first person accounts of events and actions are necessary to provide a basis for researcher inferences about perceived meanings. Based on this belief, the researcher interviewed middle level teachers to determine their perceptions of the implementation of a 4 x 4 semester block schedule in their buildings.

### ***Procedure***

Few middle schools have adopted alternative block scheduling practices such as the 4 x 4 semester plan that places students in four classes a day, of 80 to 90 minutes each for only a semester's length of time. The researcher learned that two local middle schools had implemented the 4 x 4 semester block schedule format that matched the schedules used in their districts' high schools. The author studied the effects of block scheduling at these local middle schools due to 1) questions concerning the ability of the 4 x 4 semester block plan to meet the developmental learning needs of young adolescents; and, 2) a need to identify middle level teacher beliefs of the effects of the 4 X 4 semester block schedule on their instructional behaviors and curricular decision making.

- Teachers in two middle level schools were interviewed at length to determine responses to two primary concerns:
- teachers' perceptions of the impact of the 4 x 4 block schedule on their instructional practices and curricular decisions; and,
- teachers' views on how implementing the 4 x 4 semester block schedule affects young adolescents' learning.

The researcher designed a nonscheduled interview guide consisting of approximately 25 questions focused on the following:

- How does teaching in a 4 x 4 semester block scheduling format affect the instructional strategies that teachers use?
- How do teachers believe that teaching in longer block periods affects student learning?
- How does block scheduling affect how teachers assess student learning?
- How does block scheduling impact teachers' curricular decision making?

Each interview lasted for approximately 35-55 minutes. The interviews were audio-taped and transcribed. **Data Sources** Two middle schools located in a mid-Atlantic state were selected for the study. These schools are two of the few middle schools in the area that have implemented any type of alternative scheduling arrangement. One middle school is located in a suburban area and is composed of sixth through eighth grade with approximately 400 students at each level. The second middle school is located in a rural area and contains seventh and eighth graders with a total school population of 450 students. All teachers were invited to participate, but a total of only ten volunteered to be interviewed. A random sampling of respondents was not instigated which prevents statistical inferences from being developed and prevents any generalization of findings to other educational settings. Six teachers were interviewed in the suburban school and four teachers from the rural school. Years of teaching experience among those interviewed vary from two to twenty-eight years with an average teaching experience of 14.4 years. All ten have taught in both traditional and 4 X 4 semester block scheduling formats. The subject areas they teach, the number of respondents within each subject area, and the grades they teach include,

- science-one-eighth grade teacher
- English-one-seventh grade teacher

- social studies-four-one sixth and seventh grade teacher, one seventh, and two eighth grade teachers
- mathematics-two-both seventh and eighth grade teachers
- media specialist-one-sixth, seventh, and eighth grade teacher
- learning support-one-seventh and eighth grade teacher

### ***Data Analysis***

The ten audiotapes were transcribed. Transcriptions were analyzed using the constant comparative method in order to identify themes (Glaser & Strauss, 1967). The recurring themes identified during the data analysis were integrated to develop findings. Qualitative researchers attempt to examine and report actions within a specified time and place. Based on these limitations, it is not appropriate to generalize the findings from this study to other populations. Following analysis of the data collected, two researchers separately identified major themes and compared their findings to provide internal reliability to the study (LeCompte & Preissle, 1993). Discussion of Findings In summarizing the common findings among the two researchers, four themes emerged from the data analyses. With each theme, a set of teacher quotes is provided which support the finding.

### ***Altering Instruction***

An explicit question respondents were asked was how moving to a block schedule affected teachers' instructional behaviors. The following finding emerged from the data:

- 1) Teachers describe utilization of a much wider variety of instructional strategies since moving to the block schedule (e.g., more cooperative learning, problem solving activities, and use of more computer-based projects).

Nine of the ten teachers interviewed indicate that they changed some instructional processes as a result of moving to the 4 X 4 semester block schedule. Each of those nine teachers described some of their alterations. These comments are from Dan (pseudonyms are used for respondents), an eighth grade social studies teacher: "I have absolutely changed instruction. I use much more hands-on strategies now; such as Internet activities, projects, research in the library, a lot more in-depth discussion, and a lot more critical thinking." Judy, a mathematics teacher, described the changes she implemented, "I can probe concepts more deeply which means better. I can apply more problem solving, more technology with computers, or geo-sketch pads." Sherry, a social studies teacher, indicated that the 4 X 4 block, "Allowed students to talk more with classmates for collaborative learning." She also believes that the 4 X 4 block format provides her with more time for individual student conferencing. Other instructional changes mentioned by respondents include the opportunity for more time for classroom debates and added time for reflection when students don't understand principles. Chuck's response summarizes the tenor of changes made by these teachers: "It's [the block schedule] forced me to be more diverse in my teaching. I tended to be more teacher-centered before-now I'm more child-centered."

### ***Perceived Effect on Students' Learning***

Another component of the study was determining whether teachers believed that students' learning was affected as a result of switching to the 4 x 4 semester block schedule. Respondents were asked initially to explain what students are doing when they are learning. The most commonly mentioned actions were "problem solving, working in groups, using information to create or produce new knowledge, communicating successfully, and manipulating objects or ideas." The respondents' descriptions of their instructional behaviors are an indication that they are acting in ways that support their beliefs about how students learn. The following finding is related to matching instructional behaviors to beliefs about learning.

- 2) Nine of the ten respondents believe that teaching in the 4 x 4 semester format positively affects young adolescents' learning.

Judy explained her beliefs, "Because we have more time each day, the stronger the concepts become and the better the understanding." Becky, a learning support teacher, noted, "Learning improves because you can vary the activities which allows you to address the different learning styles." A seventh grade mathematics teacher,

Jim, added, I think more information is sticking with these students with the 80 minute periods. They have opportunities to think about why they are performing certain functions and operations. I find most of my former students are doing better in eighth grade after they've had the block. Most of the respondents believe that because students have more time for learning, it allows them more opportunities to manipulate ideas, to practice specific content-area skills, and provides additional reflection time. These activities are likely to engage students, creating more meaningful learning experiences.

### **Effects on Curricula**

The issue of choosing what to teach is ultimately the decision of each classroom teacher. Most teachers readily admit they follow curriculum guides or use textbooks as a primary source for deciding what the curriculum will be in their classrooms. High stakes tests often drive curricular decision making for teachers who feel a responsibility for students' performances on standardized assessments. Teaching in longer time blocks requires educators to readjust their curriculum plans regardless of the rationale for curricular decision making. Secondary educators who teach in the 4 x 4 semester block schedule have approximately 18 weeks with students. Teacher perceptions are that when students are only in a course for 18 weeks instead of 36, mandated curricular content will be short-changed. Teachers' perceptions that the academic year is shortened by half in the 4 X 4 semester block format creates a change in teacher attitudes about curriculum.

- 3) All respondents admit that the curriculum needs to be adjusted in teaching in the 4 x 4 semester block schedule; and, the need to change the curriculum is perceived by most of those interviewed as a positive aspect of implementing the 4 x 4 semester block schedule.

Eight of the ten respondents suggested that they now change the curriculum from how they previously teach it due to block scheduling. In both middle schools, the 4 x 4 semester block created one semester courses rather than whole year courses. Teachers indicated that this change meant they would complete less of the curriculum. Two teachers stated that some units were deleted due to the semester length course. Dan noted though, "I cover 25-30% less content but, I teach it better, and the kids understand it better." Carol echoed others' curricular concerns: I think the curriculum has to change. Whether or not it can afford to because in terms of what needs to be covered, I don't know. I wonder, 'Do you scale back your curriculum to allow for more in-depth study and sacrifice what the kids need to know?' I think some curricula lend themselves to the block more than others. The researcher found that these teachers have three critical concerns about curriculum:

- "How much of the curriculum should I complete?"
- "Which units are the most critical to learn?"
- "Which units can I afford to delete due to less time I will have students in class?"

Effective planning creates a dilemma for every teacher. Adopting larger blocks of instructional time within a 4 x 4 semester scheduling format poses philosophical questions, however, that teachers may not have previously encountered-questions that directly affect decisions about their daily practice. Dan, a seventh grade teacher, reflects teachers' concerns with his thoughts: "It took me two years of teaching in the block before I said, 'Okay, I can let go of some of this content.'" Teachers in both schools did receive at least two days of training to adjust instructional processes and curricular expectations. The concerns expressed by these teachers indicate a need for more in-depth and adequate training on instructional changes and curricular decision making when they move to a 4 X 4 semester block scheduling format. Responses from these teachers indicate that their curricular prioritizing is accomplished without concern for planning an appropriate scope and sequence. Teachers' comments also indicate a need for more reflection and collaboration to prioritize content

### **Effects on Assessing Students**

Educational researchers might be encouraged by the changes that teachers implemented in their instruction and curricular decision-making as a result of moving to the block schedule. The researcher wondered though,

"If instruction is altered and teachers are willing to alter their curriculum within the 4 X 4 semester block schedule, are they likely to change the way they assess students?"

- 4) Five of the teachers agreed that they alter their assessment strategies as a result of using the 4 X 4 semester block scheduling format. The remaining five respondents indicated that they do not initiate changes in their assessment methods.

Dan, a social studies teacher, uses more essay questions and much less rote memorization on his assessment instruments as a result of longer periods. He added, "I look to use more application-type questions." Judy, a mathematics educator, noted, "I give more problem-solving situations, such as the spaghetti tower activity." A science teacher explained, "I do more different kinds [of assessment]: visual, experiments, and more realistic evaluation with equipment to test laboratory skills." Those teachers who did not alter their practices provided no reasons for continuing their past assessment techniques.

## Conclusion

The value of implementing alternative block scheduling formats at the high school level is positively documented by several studies (Dow & George, 1998; Queen et al., 1998; Reither, 1999; Shortt & Thayer, 1999). Teacher attitudinal surveys report positive support for initiating flexible schedules (Queen et al., 1998; Staunton & Adams, 1997). The instructional changes that teachers implement reflect innovative practices (Salvatterra & Adams, 1995; Shortt & Thayer, 1999). The intent of this study was to determine whether educators who implemented a 4 x 4 semester block schedule at the middle school level perceive similarly positive results in their instructional behaviors and in student learning. This study reveals that middle school teachers at two schools believe that the 4 X 4 semester block schedule improves student learning while meeting their cognitive needs. Additionally, teachers describe implementing several changes in their instructional strategies that benefit students: providing greater opportunities for student reflection; designing activities that promote critical and creative thinking through extended opportunities for manipulation of concepts and principles; and use of more student-to-student collaborative learning experiences. Changes in teachers' instructional behaviors are critical and have the power to improve student learning, academic success, and overall teacher effectiveness. Perhaps most importantly, many of these teachers are willing to alter previous curricular scope and sequence to adjust to the needs of middle level students who take courses for half the academic year. Comprehensive inservice training is required for teachers to make changes in their instructional strategies that match the challenge of implementing longer periods for learning (Bevevino et al., 1999; Smith et al., 1998). Perhaps the greatest change that must occur is for teachers to accept Sizer's view that, "less-is-more ..." (1992, p. 149) when determining the amount of content to study within a year. Teachers' views on curricular decision making are linked to their philosophies concerning what students must learn within an academic year and the roles of students and teachers in reaching desired learning outcomes. One's perspectives of curricular responsibility perhaps unconsciously impact the planning and delivery phase of daily lessons. Perhaps the greatest challenge for educators at teacher training institutions and in inservice training situations, as more schools move to various flexible scheduling designs, is to help teachers understand the philosophy, theory, and value of learning content in a more in-depth manner versus the belief that teachers need to cover only the surface of enormous amounts of content throughout the year. Several positive changes in teachers' knowledge of student learning and instructional behaviors are noted in this study. Despite these findings, researchers of block scheduling issues for middle level schools suggest that a schedule more flexible than the 4 x 4 semester block is needed to meet the needs of young adolescents (Hackman and Valentine, 1998). Middle level curriculum should be organized around major themes that are interdisciplinary and student directed (Beane, 1993). Teachers must be provided the time to meet as teams to assist students in the planning of interdisciplinary units and to guide student learning and decision-making about how information will be learned and assessed. The 4 x 4 semester block schedule examined here prevents teaming, thus lessening the opportunity for teachers to develop thematic interdisciplinary units, or to provide time for students to design units. Flexible scheduling periods are needed for students to engage in meaningful learning for either long or short blocks of time based on students' needs and interests. Team teachers should be empowered to alter class periods daily based on students' needs for research, collaborative planning, presentations, or extended assignments (Knowles &

Brown, 2000). The 4 x 4 semester block schedule used in these two middle schools limits each class period to a rigid 80 to 90 minutes in a traditional single subject approach to teaching. These two middle schools adopted this structure primarily to parallel their high schools' schedules. The change to a 4 x 4 semester block schedule at the middle and high school level is actually a half-way step toward the ideal school organization. Ideally, teachers would work in teams to facilitate student designed interdisciplinary curriculum (Beane, 1993; McEwin, 1997; NMSA, 1995). Each day would be structured differently to address students' academic needs for that day as they plan and implement personal learning agendas. Flexible schedules would also provide time for student performances and other exhibitions as evidence of their learning for assessment purposes (Knowles & Brown, 2000). Despite these concerns, the changes that these teachers initiated in these two middle schools in their instructional strategies are positive steps that may lay the groundwork for encouraging more middle schools to make the transition to alternative scheduling formats. Adopting a 4 x 4 semester block schedule may be a stepping stone to the type of flexible scheduling needed to create interdisciplinary learning that young adolescents should receive. Evidence exists from these data that by implementing a block schedule, teachers improve instruction and assessment in ways that promote greater student understanding and begin to address the cognitive and social needs of young adolescents.

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