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Conflicts of Time: Examining School Schedules in Secondary Agricultural Programs

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Abstract

The purpose of this study was to examine how school schedules can or cannot be justified through the perspective of student performance on state core content assessments and occupational skills standards assessments. This study utilized the Theory of Power in Education when considering school schedules as a means to student success on core content and occupational skills assessment. The population of this study consisted of secondary agricultural programs (n = 136) across the state of Kentucky. The survey revealed the majority of secondary agricultural programs work on a seven-period day. Secondary agricultural programs received the highest pass rate on the production livestock occupational skill standards assessment. The majority of students received a passing score on the state mandated assessment area of reading no matter the schedule. Less than half of agricultural students received passing scores in Math, Science, and Social Studies. Trimester schedules had the lowest pass rate in the areas of Reading, Science, Social Studies, and Writing while only outperforming 4x4 block in Math by one percentile.

Key Words: schedules, mandated assessment, Theory of Power in Education

Researchers, policy makers, and educational leaders have focused on school scheduling as a means for educational reform. According to Andrews (2003), approximately 50% of all schools in the U.S. once operated on some form of block scheduling. The rise in support for a change in scheduling has been attributed to multiple benefits such as more time to focus individually on student needs, less class preparations, increased number of electives, and lower school budgets (Traverso, 1996; Zepeda & Mayers, 2006). The variety of options in secondary school schedules has increased because there is a lack of research evidence to support block scheduling actually improves student academic achievement (Stanley, Spradlin, & Plucker, 2007). Since 1994, the National Commission on Time and Learning has encouraged educators to explore new and innovative school day structures. Now, with a diversity of schedules there is no concise answer as to what is the best schedule for high schools (Baker, Joireman, Clay, & Abott, 2006).

The need to conceptualize how schedules affect student success across academic core content and curriculum has been a target of research. In a 2006 research synthesis, ambiguous

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results on block scheduling and student learning was found (Zepeda & Mayers). One study reported students on block-schedule outperformed students on a traditional schedule in four academic content areas, while two other studies reported contrasting results (Zepeda & Mayers, 2006). The research conducted on trimester schedules is not as extensive as research focused toward traditional, block, and modified forms of block scheduling. Although no significant comparison exists among academic achievement, there are several benefits found for trimester scheduling. The benefits of trimester schedules for students include student focus on assignments, ability to take more courses throughout the year, and increased opportunity for successful transitioning (Williamson, 2011).

Recommendations for further research include comparing schedules to student achievement and learning climate. In 2009, Allen studied the perceptions of students and teachers who had used both traditional and block scheduling. Allen found that teachers preferred traditional schedules while students were evenly divided on their preference for either traditional scheduling or block schedules. Allen (2009) did find that teachers received no training on how to teach in a block schedule.

In 2010, Smith conducted a longitudinal study of Mississippi student assessments and administrator's perceptions of block scheduling versus traditional scheduling. Smith, who examined scores over a five year period, determined the only significant increase in mandated assessment for secondary students on block scheduling was in the area of Algebra and Biology.

Stanley, Spradlin, and Plucker (2007) conducted a meta-analysis of research on time and academic achievement. Many of the studies reported conflicting results related to assessment and schedules. They concluded "a lack of consistency in teacher training and school reform in conjunction with school scheduling may be what has produced varying results in the educational research findings" (p.3).

Within agricultural education research, Moore, Kirby, and Becton (1997) concluded that block scheduling allowed for increased enrollment in courses, provided more opportunities in laboratory instruction, and improved teacher planning time. They also concluded that students would become disinterested if methods were not varied on block schedule. A study with various secondary animal science courses found students on a 4x4 block schedule were significantly outperformed by students on a modified A/B block schedule (Edwards & Briers, 2000).
Currently, a lack of research exists comparing multiple schedules within agricultural education.

According to Ainsworth and Viegut, (2006) educational institutions suffer from "initiative fatigue" (p.1) where multiple programs are employed to improve student achievement. The addition of more programs results in fragmentation and frustration causing programs to fail. The implementation of new schedules as an initiative to improve schools is often done hastily by administrators and decision making councils. This study seeks to describe the impact different schedules utilized in Kentucky have on the overall pass rate of agricultural education students on state mandated assessments.

Theoretical Framework

This study utilized the Theory of Power in Education when considering academic and occupational skills performance as a means to compare school schedules for secondary agricultural programs. This theory is derived from Steven Lukes' (1974), Theory of Power, which states that one individual (A) exercises power when they affect another individual (B) in a manner that is contrary to that individual's (B) interests within certain contexts and circumstances. Therefore, power relations begin with a conflict of interest and the theory assists in identifying where these conflicts arise in schools and school systems (Burbules, 1986). Figure 1 further describes the conflict as the individual (A) has power over institutions, procedures, and agendas which will affect the individual or groups (B) and (C) that interact on each other.

Researchers have elaborated on Lebel's figure to demonstrate how a principal or administrator can exert power over both students and faculty. This is illustrated in Figure 2.

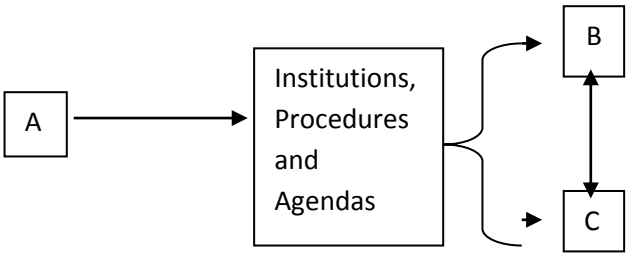

Figure 1. Power through agenda setting (Lebel, 2006)

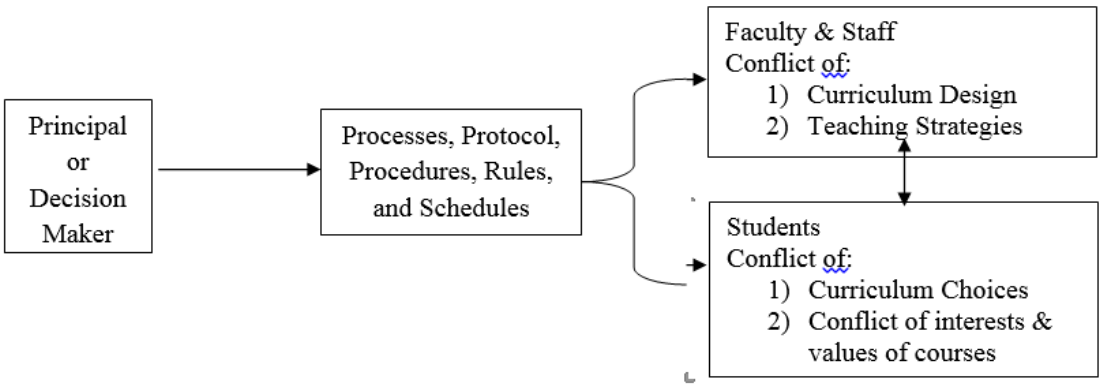

Figure 2. Power of decision makers through agenda setting

Researchers see the prinicipal, or decision maker, using his/her power to change and modify school processes, protocol, procedures, rules, and even schedules. This has a direct influence, and can be at conflict, with the interests of both the faculty and students. The researchers see the major conflict occurring for faculty in how the faculty design curriculum and even specific strategies and methods of teaching. The researchers see the major conflict for students as the power over them through lack or set curriculum choices and conflict of interests and values of the courses.

According to Foucault (1980) power does not operate only to repress but also to produce effects at the levels of desire and knowledge. In education, when seeking the best possible results power is exerted over the students by choosing what is best for the students without their input. Therefore, power can be utilized to produce positive or negative emotions and is a relation of human attitudes and/or actions against a set of conflicting interests (Burbules, 1986). Willis (1977) termed compliance as a response to power that varies in levels of resistance. One individual may show strong disregard towards an act of power because it conflicts with their values where another person may show less resistance because of acts of persuasion, manipulation, an appeal to authority, or even incentives (Burbules, 1986).

Burbules (1986) concluded that power relations form the processes and outcomes of schooling because there are preexisting conflicts of interest within society. The school is a reflection of these conflicts. Also, these power relations form policy and protocol because schools are set up in a way that creates conflicts of interest with structures of ideology, authority, and organization. Within education, decisions are made on discipline, curriculum, and scheduling through a beuracratic and hierarchial system that elicits responses from teachers, students, and community members. The decisions that affect the organizational features of schools can only be justified when they promote the interests of the students (Burbules, 1986).

This study examines how school schedules can or cannot be justified through the perspective of student performance on academic core content state mandated exams and occupational skills standards assessments. The conflict of interest that arises making power possible is determining which schedule best suits the needs of the students to perform on selected assessments. Power is executed by school board members, school administrators, and decision making councils. Schedules are employed as a form of power over the students and teachers operating within the educational system and the implications on learning are examined in this study. Agricultural education must also be aware of the Power in Education when it pertains to scheduling. Administrators exhibit power by choosing the schedule, but not always the schedule that works best for agricultural education or other career and technical education courses. Through the use of Common Core and the emphasis on College and Career Readiness, Career and Technical Education courses are in a position of more importance than in the last thirty years. Through this position, it only seems logical that principals develop schedules that are most effective for students including those in agricultural education and other career and technical education courses.

Purpose and Research Objectives

The purpose of this study was to compare the effectiveness of school schedules at preparing students in secondary agricultural programs in Kentucky for academic core content state mandated exams and occupational skills standards assessments. The study was guided by the following research objectives.

1) Describe the schedules of Kentucky secondary agricultural education programs.
2) Describe the percent pass rate of Kentucky secondary agricultural programs on occupational skills standards assessments (agricultural business, horticulture, production crop, and production livestock).
3) Describe the difference of program percent pass rates on the occupational skills standards assessments (agricultural business, horticulture, production crop, and production livestock) as determined by school schedules (seven period day, other, trimester, six period, 4x4 block, A/B block).
4) Describe the percentage of Kentucky secondary agricultural programs' proficient/distinguished recipients on the state's core content assessments (reading, math, science, social studies, and writing).
5) Describe the difference in secondary agricultural proficient/distinguished scores on the state core content assessments (reading, math, science, social studies, and writing) as determined by school schedules (seven period day, other, trimester, six period, 4x4 block, A/B block).

Methods and Procedures

Population

The population of this descriptive research design study consisted of secondary agricultural educators across the state of Kentucky. During the first general session of the annual summer teacher's conference, all 254 attendees were informed of the opportunity to participate in the study. During regional break-out meetings, the questionnaire was distributed to each teacher in attendance. It should be noted as a limitation of this study; this sample may not be representative of all secondary agricultural education programs and cannot be generalized to other populations. This convenient population produced 136 usable responses representing 147 agricultural programs in Kentucky. While a convenient sample lacks external generalizability, some argue that it depends on the issue being investigated (Kam, Wilking, & Zechmeister, 2007). The school schedule of agricultural education programs is what is being investigated. This being said, the researchers feel the convenient sample of the Kentucky agricultural educators is representative of the various schedules of agricultural education programs in Kentucky.

Data Collection

Data collection for this study was broken down into two distinct parts. The first portion looked to the agricultural educators in Kentucky to determine demographic information of their particular school, school schedule, and agricultural education program through the use of a survey. The instrument consisted of open-ended and short answer options in five areas: 1) school schedule, 2) classroom management, 3) youth organization, 4) supervised agricultural education (SAE) and 5) selected demographics. Teachers were asked to identify the type of school schedule out of six possible options including: 4x4 block, A/B block, six period day, seven period day, trimester, and other. Those indicating "other" were then asked to further explain their schedule. The teachers were asked to identify the school in order for the school schedule to be matched with the state mandated assessments. The instrument was evaluated by a panel of experts (n = 6) for face and content validity consisting of faculty, administrators, and two graduate students with teaching experience at the secondary level.

The second portion of data collection included a data set available from the Kentucky Department of Education. This data set included scores from state mandated assessments. State mandated assessments in Kentucky are broken down into occupational standards and academic core content standards. Academic core content standards include reading, math, science, social studies, and writing. Information in the data set also included the percentage of pass rates for each school. A performance score of *proficient* and *distinguished* are identified as passing scores on the Kentucky's mandated assessments. Performance scores of *Novice* and *Apprentice* are not identified as passing scores.

Identified program completers in the agricultural education program are required to take an occupational skill standards exam. A program completer is any student who has successfully completed, with a "C" or higher, three or more years of coursework in an agricultural career cluster sequence. The career cluster sequences that are tested on the occupational skill standards assessment include agribusiness, agricultural mechanics, horticulture, natural resources, production crop, and production livestock. Occupational standards assessments scores were provided to the researchers in a data set that revealed a percent passing score by school and by career cluster sequence.

Data Analysis

Data collected from the secondary agricultural educators were entered into the Statistical Package for the Social Sciences (SPSS version 19) and analyzed. Data for objectives 1, 2, 3, 4, and 5 were analyzed using descriptive statistics. These included frequencies, percentages, means, percentile means, standard deviations, and range.

Results

Research objective one sought to describe the reported schedules of the participating Kentucky secondary agricultural education programs. The majority of the secondary agricultural teachers reported working on a seven period day (*f* = 41.0; 30.1%) followed by a modified schedule, also referred to as other (*f* = 31.0; 22.8%), trimester (*f* = 25.0; 18.4%), six period day (*f* = 20.0; 14.7%), 4x4 block (*f* = 11.0; 8.1%), and A/B block (*f* = 8.0; 5.9%).

Table 1 displays the results of research objective 2 which sought to describe Kentucky secondary agricultural programs' performance scores on occupational skill standard assessments (agricultural business, horticulture, production crop, and production livestock). Of the 136 secondary agricultural programs that participated in the occupational skill standards assessment, the highest pass rate was in the area of production livestock (*M* = .64; *SD* = .23) followed by production crop (*M* = .59; *SD* = .38), agricultural business (*M* = .57; *SD* = .36), and horticulture (*M* = .43; *SD* = .28).

Table 1

Kentucky's Proficient & Distinguished Performance Scores (Percent Pass Rate) on Occupational Skill Standards Assessment (*n* = 136)

Assessment Areas	*Mean*	*SD*	Range
Production Livestock	.64	.23	.00 – 1.00
Production Crop	.59	.38	.00 – 1.00
Agricultural Business	.57	.36	.00 – 1.00
Horticulture	.43	.28	.00 – 1.00

Note: Performance scores reflect a percent pass rate identified as proficient or distinguished.

Table 2 explains the difference in secondary agricultural programs' percent pass rate on Kentucky occupation skill standards assessments by type of classroom schedule. In the areas of ag business and production crop, less than two percent scores were reported, therefore a mean score and standard deviation could not be determined. In the area of agricultural business (*M* = .75; *SD* = .35) and horticulture (*M* = .61; *SD* = .34) A/B block had the highest percent pass rate. Six period day (*M* = .74; *SD* = .24) reported the highest percent pass rate in the occupational skill standards assessment area of production livestock.

Table 2

Kentucky's Proficient & Distinguished Performance Scores (Percent Pass Rate) on Occupational Skill Standards Assessment by Classroom Schedule

Classroom Schedule	Ag Business *M* (*SD*)	Horticulture *M* (*SD*)	Production Crop *M* (*SD*)	Production Livestock *M* (*SD*)
Seven Period	- (-)[a]	.41 (.24)	- (-)[a]	.68 (.22)
Other	- (-)[a]	.50 (.28)	- (-)[a]	.63 (.25)
Trimester	- (-)[a]	.38 (.28)	- (-)[a]	.50 (.22)
Six Period	.22 (.19)	.45 (.25)	- (-)[a]	.74 (.24)
4x4 Block	- (-)[a]	.51 (.32)	- (-)[a]	.64 (.20)
A/B Block	.75 (.35)	.61 (.34)	- (-)[a]	.68 (.35)

Note: Performance scores reflect a percent pass rate identified as proficient or distinguished.
[a] No results because only one group represented in the assessment areas and data could not be received. Range is .00-1.00

The purpose of research objective four was to describe Kentucky secondary agricultural programs performance scores on the state's mandated assessment (reading, math, science, social studies, and writing). These scores were given as a part of a data set that included percentages of those who are proficient/distinguished in the mandated assessment areas. The majority of secondary agricultural students received a proficient/distinguished on the state mandated assessment area of reading (*M* = .62; *SD* = .14) followed by math (*M* = .41; *SD* = .18), science (*M* = .37; *SD* = .15), social studies (*M* = .36; *SD* = .15), and writing (*M* = .28; *SD* = .16).

Table 3

Kentucky's Proficient & Distinguished Performance Scores (Percent Pass Rate) on State Core Content Assessment (*n* = 136)

Assessment Areas	*Mean*	*SD*	Range
Reading[a]	.62	.14	.19 – 1.00
Math[b]	.41	.18	.09 - .79
Science[b]	.37	.15	.10 - .69
Social Studies[b]	.36	.15	.08 - .73
Writing[c]	.28	.16	.03 - .69

Grade levels of assessment areas: [a]Sophomore, [b]Junior, [c]Senior. Range is .00-1.00
Note: Performance scores reflect a percent pass rate identified as proficient or distinguished.

Research objective five was to describe the percent of proficient/distinguished recipients on the state mandated assessments (reading, math, science, social studies, and writing) as determined by school schedules (seven period day, other, trimester, six period, 4x4 block, A/B block). Table 4 helps explain the findings for this objective. In the area of reading, student completers in Kentucky secondary agricultural programs received the highest percent of proficient/distinguished scores on an A/B Block classroom schedule (*M* = .75; *SD* = .18). A higher percentage of secondary agricultural students received proficient/distinguished scores in the area of math (*M* = .50; *SD* = *.17*), science (*M* = .42; *SD* = .16), and social studies (*M* = .40; *SD* = .12) while on a seven period classroom schedule compared to other types of schedules. Secondary agricultural programs on an A/B Block classroom schedule received a higher percentage of proficient/distinguished scores in the area of writing (*M* = .34; *SD* = .12) than programs on a differing classroom schedule.

Table 4

Kentucky's Proficient & Distinguished Performance Scores (Percent Pass Rate) on State Core Content Assessment by Classroom Schedule

Classroom Schedule	Reading *M* (*SD*)	Math *M* (*SD*)	Science *M* (*SD*)	Social Studies *M* (*SD*)	Writing *M* (*SD*)
Seven Period	.64 (.14)	.50 (.17)	.42 (.16)	.40 (.12)	.32 (.14)
Other	.58 (.15)	.43 (.19)	.36 (.16)	.39 (.19)	.32 (.18)
Trimester	.57 (.11)	.31 (.17)	.32 (.11)	.30 (.13)	.17 (.11)
Six Period	.63 (.11)	.38 (.11)	.34 (.15)	.33 (.18)	.29 (.17)
4x4 Block	.71 (.16)	.30 (.19)	.36 (.13)	.32 (.06)	.22 (.11)
A/B Block	.75 (.18)	.45 (.09)	.39 (.09)	.34 (.14)	.34 (.12)

Note: Mean and Standard Deviation reflect a percent pass rate identified as proficient or distinguished.

Conclusions, Implications and Recommendations

Of the schools in this study (n =136), one-third of secondary agricultural programs in Kentucky operate on a seven period day and almost one-quarter operate on a modified schedule that is not clearly defined. Since a large quantity of the secondary agricultural programs now operate on a modified schedule, it is implied that these are designed to meet the diverse and specific needs of the school that may include but are not limited to: 1) accommodating a large volume of students, 2) incorporating new academic initiatives, 3) or to support programs that offer college credit through courses. It is recommended that additional research be conducted to determine how these modified schedules are defined and operate.

In regards to describing the percent pass rate of Kentucky secondary agricultural programs on all occupational skills standards assessments, students had the lowest percentage pass rate in horticulture regardless of schedule. When comparing schedules, the researchers conclude that A/B block had the highest percent pass rate in horticulture and trimester and seven period day had the lowest. From these conclusions, it is implied that students perform best in horticulture on a longer class period because of extended laboratory time which is consistent with research reported by Moore, Kirby, and Becton (1997). The Theory of Power in Education is exhibited by administrators and decision makers who continue on a schedule that is not resulting in adequate time for either laboratory or classroom instruction. It is recommended that secondary agricultural teachers offering a horticulture career major execute a laboratory time that is engaging, matches course objectives and state standards that reflect the state mandated assessment.

Considering the percent of students scoring proficient/distinguished on state mandated assessment, the researchers can conclude that less than one half of secondary agricultural students are proficient and/or distinguished in Math, Science, and Social Studies. Experimental studies by Stone, Alfeld, Pearson, Lewis, and Jensen (2006) and Park, Santamaria, Mandele, Keene, and Taylor (2010) found that incorporating core content into career and technical education curriculum had a positive impact on student retention of core content while not detracting from CTE content learning. This implies the majority of participating secondary agricultural teachers in Kentucky are not incorporating areas tested on the state mandated assessment into agricultural curriculum. Therefore, it is recommended that secondary agricultural teachers seek out professional development opportunities that will increase their competence in teaching strategies and methods during the extended or limited schedule. It is also recommended that administrators become more aware of the power a schedule can have on student achievement on mandated

assessments and adjust school schedules to meet the needs of career and technical students as well.

The researchers recommend that Kentucky state agricultural education staff and agricultural teacher educators collaborate to revise the Kentucky program of standards to more clearly incorporate the use of core content in agricultural courses. The researchers also recommend that teacher educators require pre-service teachers in curriculum design courses to incorporate core content standards and carry out lesson implementation with core content emphasized in the extended or limited schedule. The implementation of core content should seek to explain core content through the context of agricultural and real life applications while utilizing higher levels of Bloom's Taxonomy to promote higher order thinking. Finally, a research recommendation would be to assess if secondary agricultural teachers are competent in areas tested on state mandated exams in order to determine their ability to implement core content in agricultural curriculum in the given extended or limited schedule.

The percentage of secondary agricultural students scoring proficient/distinguished on the state mandated assessment in the area of Writing was less than one third regardless of schedule. Although there is a lack in research on implementing Writing into agricultural education, Reaves, Flowers, and Jewell (1993) concluded that agricultural students using writing-to-learn strategies were able to retain more information and gain confidence in their writing ability. Also, Quitadamo and Kurtz (2007) found that writing increased students' critical thinking skills. This implies that the increased use of writing as a teaching method in secondary agricultural education would increase critical thinking skills and therefore improve the percentage of proficient/distinguished students in Writing on the state mandates assessment. Therefore, the researchers recommend that secondary agricultural teachers in Kentucky increase the use of writing in their teaching methods as a reflective piece to instruction where students are not reporting only facts but offering personal insights to the content discussed. Creative writing portfolios and further participation in CDEs that enhance writing skills such as Marketing Plan, Agriscience Fair, and Job Interview should also be encouraged. Effective writing and reflection strategies should also be increased at the pre-service level.

To understand the difference in secondary agricultural proficient/distinguished recipients on the state mandated assessments as determined by school schedules, the researchers conclude the trimester schedule had the least percentage of proficient/distinguished scores in the areas of Reading, Science, Social Studies, and Writing. In addition, McCreary and Hausman (2001) found that students on trimester schedule had, on average, lower GPA's and more absences when compared to students on a seven period day. To adapt to the challenges of teaching secondary agriculture on a trimester schedule, the researchers recommend that secondary agricultural teachers sequence courses carefully and do not attempt to condense courses down to basic material that can be covered within the time constrains of the shortened semester. Instead, courses taught on a traditional seven period day such as Animal Science could be separated by grouping units together and forming new classes.

In the areas of Science, Math, and Social Studies, the seven period day schedule had the highest percentage of students earning proficient/distinguished scores. Utilizing the Power in Education Theory, it is recommended that secondary agricultural teachers advocate for the adoption of a seven period day if seeking to improve the percentage of students scoring proficient/distinguished in Science, Math, and Social Studies on state mandated exams. Teachers only want the most success for all students. Secondary agricultural teachers should incorporate core content in applicable and relevant contexts to the students' lives. Quint, Thompson, and Bald (2008) concluded that students want reassurance that what they are learning will help them in the future and this will create intrinsic motivation for retaining content knowledge. In the area of Reading on the state mandated assessment A/B block and 4x4 block had the highest percentiles of students earning proficient/distinguished.

From the results of this study, further research in the areas of school scheduling and how the Power in Education Theory is utilized to exhibit power of other populations is recommended. There is also a need for this study to be conducted in other states as they relate to school schedules and state mandated assessment. The researchers further recommend research in school schedules and other career and technical education courses to determine how schedules affect student performance on state mandated assessments.

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