

2018

The Impacts of Delayed Starts in Maine Schools

Tim Tweedie

University of Maine at Farmington

Follow this and additional works at: https://scholarworks.umf.maine.edu/ed_leadership_projects

Part of the [Educational Leadership Commons](#)

Recommended Citation

Tweedie, Tim, "The Impacts of Delayed Starts in Maine Schools" (2018). *M.S.Ed. in Educational Leadership Research Projects*. 2.
https://scholarworks.umf.maine.edu/ed_leadership_projects/2

This Research Project is brought to you for free and open access by the Graduate Works at Scholar Works. It has been accepted for inclusion in M.S.Ed. in Educational Leadership Research Projects by an authorized administrator of Scholar Works. For more information, please contact sotley@maine.edu.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

The Impacts of Delayed Starts in Maine Schools

Timothy M. Tweedie

Houlton High School

University of Maine at Farmington

Tim Tweedie is currently a high school Social Studies teacher for RSU 29 in Houlton, Maine.

He is a graduate student at the University of Maine at Farmington

and is pursuing a Master's Degree in Educational Leadership.

Tim can be reached via email at tim.tweedie@rsu29.org

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Abstract

The purpose of this mixed methods study was to investigate the benefits and challenges associated with delayed starts in Maine High Schools. In the past few years, several school districts in the midcoast-southern region of the state have elected to delay their high school start times for the purposes of allowing students more sleep. Across the five districts, administrators reported benefits to the delayed starts, and teachers reported more mixed results. In comparing Feedback between the five districts, the alignment patterns varied considerably.

Keywords: delayed starts, sleepiness, staff, administrators

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Table of Contents

Abstract	2
Table of Contents	3
Introduction	4
Literature Review	5
Benefits and Challenges of Implementing Delayed Starts	5
Additional Health Benefits.....	8
Questions and Challenges Associated With Delayed Starts.....	8
Summary and Conclusions.....	10
Research Methods.....	12
Setting.....	12
Participants.....	13
Methodology.....	13
Data Collection.....	15
Data Analysis.....	15
Expected Findings.....	16
Potential Issues and Weaknesses.....	17
Results	18
Administrator Responses.....	19
Administrator Reported Benefits Attributed to Delayed Starts.....	20
Administrator Reported Challenges Related to Delayed Starts.....	22
Administrator-Provided Advice Regarding Delayed Starts.....	25
Demographics of Participating Teachers.....	26
Teacher Reported Academic Benefits Attributed to Delayed Starts	28
Teacher Reported Academic Challenges Attributed to Delayed Starts	32
Challenges Delayed Starts Cause Parents and Community Members	35
Discussion.....	37
Implications of Research.....	39
Implications for Practice.....	39
Conclusion.....	40
References.....	41
Appendices.....	43
Appendix A: Interview Questions For Administrators.....	43
Appendix B: Survey Questions For Teachers.....	44
Appendix C: Administrator Interview Consent.....	45
Appendix D: Teacher Survey Consent.....	47
Appendix E: Local Administrator Consent.....	49

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Introduction

Research concludes that adequate sleep is essential for childhood learning, as adolescence is a time of important physical, cognitive, emotional, and social change. The U.S. Centers for Disease Control and Prevention (CDC) reports that in 42 states, 75-100 percent of public schools start before 8:30 a.m. (McKeever & Clark, 2017). Relationships between early school start times and poor academic performance suggest that school systems may inadvertently be promoting sleep deprivation through early school start times (Keller et al., 2015). The way adolescents sleep critically influences their ability to think, behave, and feel during daytime hours, likewise, daytime activities, changes in the environment, and individual factors can have significant effects on adolescents' sleeping patterns. Because sleep is so vitally important to both our overall physical health and mental health, many school districts throughout the country have modified their schedules to begin their days later and the results of those changes have been mostly positive.

Despite the various benefits attributed to the implementation of delayed starts, complications do exist. Transportation costs, availability of morning child care, and scheduling conflicts with after school student activities are just a few of the problems school districts have to address when considering the implementation of delayed starts. The purpose of this study was to determine, according to Maine educators, what potential benefits and complications are associated with delayed school start times.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Literature Review

Benefits and Challenges of Implementing Delayed Starts

In the United States, most secondary school days start between 7:30 and 8:00 am, meaning that children have to awaken much earlier than their bodies prefer (Kirby, Maggi, & Angiulli, 2011). Researchers indicated that children, especially teenagers, forgo sleep in order to make these early start times. Educators and medical professionals have long suspected that starting the school day later in the morning would greatly benefit students. While many of the benefits include less reported sleepiness, as well as better academic performance in school and on cognitive tests, other benefits included reports of improved moods and a reduction in teen motor vehicle crashes.

Although adolescents need on average 9 1/4 hours of sleep per night for optimal performance, health and brain development, teens average fewer than 7 hours per school night by the end of high school, and most report feeling tired during the day (Wolfson & Carskadon, 2005). This has prompted some educational leaders to consider implementing delayed start times to the school day.

In order to determine an ideal start time, researchers often use the Epworth Sleepiness Scale, the Sleep-Wake Behavior Problems Scale, and other tools to measure the impact of delayed starts. A 2010 study conducted by Owens, Belon, and Moss indicated that the majority of the 357 grade 9-12 Rhode Island students who participated in their study, reported being more tired prior to the implementation of delayed start times, than they were after the delayed start was instituted. Prior to changing their school start time from 8:00 am to 8:30 am, 69.1% of students who participated in their study reported “never getting enough sleep.” After the delayed start

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

was implemented, only 33.7% of those same students reported “never getting enough sleep.”

Their research findings also indicated that students rated themselves as less depressed and more motivated to participate in a variety of activities and are less likely to seek medical attention for fatigue-related concerns in conjunction with the change in start times.

A Sleep Habits Survey conducted by Wolfson and Carskadon (1998) was used to assess daytime sleepiness, sleep schedules, and sleep patterns of 3,120 public high school students. Their study results indicated that students who described themselves as struggling students (C’s, D’s, and F’s) reported that on school nights, they obtain about 25 minutes less sleep and go to bed on average of 40 minutes later than their peers. The results of their study recognized that adolescence is a time of important physical, cognitive, emotional, and social change. Likewise, daytime activities, changes in the environment, and individual factors can have significant effects on adolescents’ sleeping patterns. The researchers also found that there are negative academic impacts related to a lack of sleep. Owens, Belon and Moss had similar research results. Their findings indicate that sleepy adolescents, that is, those with inadequate sleep, are prone to encounter academic difficulties. After having surveyed 200 high school students, Owens, Belon, and Moss (2010) found that more total sleep, earlier bedtimes, and later weekday rise times are associated with better grades in school.

To better understand the impacts of delayed starts, Walhstrom (2002) conducted a four year study to examine the effects of delayed starts in a large, urban school district that altered high school start times significantly from 7:15 a.m. to 8:40 a.m. This change affected more than 12,000 secondary Minnesota students with a total K–12 population of nearly 51,000 students. Walhstrom examined the effects of the delayed start, finding significant benefits such as

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

improved attendance and enrollment rates, less sleeping in class, and less student-reported depression. His findings indicated that attendance for this demographic of students improved by at least 4% in each district and by as much as 6% in one after the delayed start was implemented. A more recent study conducted in Kentucky schools, Keller, et al (2015) also found similar results. In this study, the researchers discovered that attendance rates increased by 3.2% after a one hour delayed start was implemented. The same study also found associations between early school start time and poorer school performance primarily in schools serving few students who qualify for free or reduced-cost lunches.

While the majority of studies regarding delayed starts primarily focus on adolescents, the research is not restricted to students in grades K-12. In a 2014 study, Hershner and Chervin discovered that daytime sleepiness, sleep deprivation, and irregular sleep schedules are highly prevalent among college students, with 50% of their survey respondents reporting daytime sleepiness and 70% reporting insufficient amounts of sleep. Consequences of sleep deprivation and daytime sleepiness in college students that were reported in their study include: lower grade point averages, increased risk of academic failure, compromised learning, impaired mood, and increased risk of motor vehicle accidents.

Bauml, Holterman, and Abel (2014) conducted a series of five experiments to determine whether sleep influences the testing effect in college students. The experiments consisted of 224 German college students who were measured on their memory retrieval before and after being deprived of sleep. The results consistently showed that sleep-deprived students were slower with recall and retrieval than students who had received the recommended amount of sleep. The research team concluded that sleep, or the lack thereof, had critical effects on college students'

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

abilities to recall information when tested.

Additional Health Benefits

While the research findings related to academic performance appears to favor delayed starts, researchers have also found other potential benefits related to later school start times. Vorona, Szklo-Coxe, Lamichhane, and Ware (2014) examined the effects early high school start times had on motor vehicle accidents, specifically in Virginia. The research team concluded that teenage drivers demonstrated a statistically significant higher crash rate (53.2/1,000 versus 42.0/1,000) when their school day started before 8:30am, than did students who attended schools with early high school start times. In another study, Danner and Phillips (2008) explored the connection between delayed start times, student sleep habits and teen motor vehicle crashes. The study was conducted in one Kentucky county over a two year time period. In order to assess the effects of delayed high school start times on sleep and motor vehicle crashes, a survey of the sleep habits of the students from an entire county-wide school district was administered before and after a change in school start times. The researchers found that students slept more and were in fewer motor vehicle crashes, after delayed starts were implemented. Prior to the implementation of the delayed start time, the county crash rates for teens were considerably higher than the rest of the state prior to the change in school start times. There was a significant reduction in teen crash rates (16.5%), after the delayed start was implemented.

Questions and Challenges Associated With Delayed Starts

While numerous researchers have found benefits related to the implementation of delayed

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

starts, there certainly are some challenges that educational leaders must face when considering such a change. One study (Keller, et al, 2015) of Kentucky public schools found that later school start times were associated with higher retention rates. While the research team could not account for why this happened, their findings showed that after 8:30am, for every additional minute later in the school start time, there were reported increased retention rates by 0.2%. However, in a similar study, McKeever and Clark (2017) found the opposite to be true. The results of their study indicated that attendance rates and graduation rates significantly improve in schools with delayed start times of 8:30am or later.

Certainly, some districts will also find that their transportation costs will rise, specifically in districts that have K-12 students all riding buses together. Aaron Carroll of the *New York Times* (2017) reported that delayed start school districts were more likely find transportation cost increases. Carroll estimates that the additional costs could be between \$150-\$250 annually, per student. He contributed this due to the fact that the majority of districts with delayed starts have been choosing to implement them only in their secondary schools, therefore requiring additional bussing in some districts. Districts may also encounter scheduling issues, specifically involving shared staff members. Other challenges occur when districts send students to a shared cooperative school, such as a regional vocational school. And inevitably, districts that implement delayed start times will have to reconfigure their after school schedules to accommodate athletic teams, school clubs, and other after school activities.

One team of researchers found no evidence to suggest that delayed starts would positively impact student performance or mood (Smaldone, et al., 2007). In this particular study, the research team concluded that school start times are much less likely than economic status,

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

peer academic habits, family conflict, parental emotional health, parental anger, and other social elements when determining reasons for student performances and moods.

Maume (2013) also noted that there are likely to be other, non-social factors that contribute to sleep disruption, including puberty and other biological causes. According to his findings, delayed starts will not fix the problems related to adolescent sleepiness if other factors that take place outside of school, are not corrected. While educators cannot control some of identified factors, such as marriage/divorce rates, Maume suggests that they could try to educate parents about the importance of set bedtimes. He claimed that if parents knew how much of a positive impact a set bedtime could have on their child's educational performance, they might pay more attention to this at home. Drawing on a sample of 974 teens from the Study of Early Child Care and Youth Development, his research study focused on the social relational factors that predict changes in youths' sleep patterns between 12 and 15 years of age. In general, social relational factors outperform developmental factors in determining youths' sleep patterns, particularly pointing to the importance of parental, peer, and school ties in promoting healthy sleep behaviors.

Summary and Conclusions

The ongoing debate regarding the more widespread implementation of delayed start times for high schools is a controversial one, and the logistical considerations in implementing later school start times in high schools are far from minor. Many researchers have uncovered numerous potential benefits of initiating delayed starts, thus, it is particularly important to continue to rigorously assess outcomes in those schools that have instituted these changes. However, the implementation of delayed starts is not quite as easy as simply considering the

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

potential benefits that often accompany the adjusting of school schedules to accommodate adolescents' sleep needs. Rather, there are many other challenges that may arise, including changes to transportation budgets and schedules, availability of morning daycare for children of working parents, higher electric bills during some months of the year, scheduling issues, especially in districts with shared staff members, and needed changes to the scheduling of after school/evening activities. For school board members, administrators, and other stakeholders, it is important that they consider all implications of delayed starts, prior to deciding whether or not to adjust the start times to their school day.

Despite some mixed results, the vast majority of scientific studies are in agreement when it comes to the benefits of delayed starts. Educators and sleep experts concur that adolescents have been found to experience better memory recall, better academic performance in school and on cognitive tests, higher attendance rates, and lower rates of teen motor vehicle accidents after delayed starts have been implemented. However, researchers have reported mixed results regarding the impact delayed starts has on retention rates. In addition, several studies have discovered some negative effects of delayed starts, including the amount of class time students involved in extracurricular activities miss due to early dismissals. Therefore, prior to advocating for the implementation of delayed starts, there are several other factors that educational leaders must consider, including: impact on transportation costs, effects on after school activities, effects on shared district staff members, costs associated with increased energy bills, and negative impacts on parents. The purpose of this study is to discover the positive, neutral, and negative effects experienced by Maine administrators and teachers that work in districts with delayed starts.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Research Methods

Setting

The research will be gathered from five Maine high schools that are currently using delayed start times. These districts were identified in 2016 and 2017 newspaper articles regarding delayed starts in Maine schools. Each of the schools are located in coastal regions of mid-to-Southern Maine and have recently modified their daily school schedules to allow for later start times. The names of the schools will be modified to ensure confidentiality.

Table 1

Student Enrollment, Setting, and Year of Implementation of Delayed Start Times

District	Number of Students Enrolled at the High School	Setting (Rural, Suburban, Urban)	Year of Delayed Start
District A	887	Urban	2017-18
District B	793	Urban	2016-17
District C	631	Suburban	2016-17
District D	249	Suburban	2016-17
District E	688	Rural	2017-18

Participants

There are two groups of participants that took part in this study. The first group consisted of five administrators, with one from each of the participating districts. Superintendents from each of the identified district were contacted to seek permission to conduct a telephone interview with one administrator of their choosing from their district. The interviewing of superintendents

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

or principals was preferred for two reasons. The first reason was that superintendents and principals were likely to be the most knowledgeable, as they were responsible for implementing the schedule change. Secondly, superintendents and principals were preferred as to remain consistent with the perspective of the benefits and challenges related to delayed starts in each of their respective school districts. The researcher provided each superintendent or principal with a copy of all interview questions prior to conducting the interviews.

Once permission to interview was obtained from administrators in each school district, the researcher conducted an eight question telephone interview with each of the administrators. The questions were designed to be open-ended (Appendix A). The researcher informed each participant that the telephone interviews were being recorded for later use in this study.

Once given administrative consent, the second group of participants in this study was designed to be the teachers from the five school districts participating in the study. However, District E administrators preferred that their teachers not be surveyed, as they were in the process of conducting their own review. Therefore, only teachers from Districts A, B, C & D were surveyed. The researcher sent a survey, via Google Forms, with eight semi-open ended questions related to the teachers' experiences with delayed start times. The researcher obtained all of the participants email addresses from either the school districts themselves or the Maine Department of Education database.

Methodology

The method of this study was a convergent mixed methods model, with qualitative interviews and a mixed survey. The administrator interviews were structured and consisted of a

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

series of predetermined questions that all interviewees answered in the same order. The interviews were recorded, and were qualitative in nature. The questions were designed to encourage open-ended answers, so to allow the interviewees with opportunities to provide honest and accurate information. This means that the responses may not represent a fully developed database, as is often collected in qualitative research. Once all of the interviews were collected, the researcher looked for overlapping themes in the open-ended data, categorized responses by theme, and counted the number of times particular themes occurred (Creswell, 2015).

As with the administrator interviews, the teacher questionnaires consisted of open ended questions. Some of the questions are considered “open-ended” because the responders were free to answer in any manner he or she chose. However, unlike the administrator interviews, the teacher questionnaires also consisted of closed response questions, such as “Were you in the district when delayed starts were implemented?” The closed ended questions were selected for the purposes of quick data collection regarding the responders positions at their high schools, how long they have been in their current position, the year in which their district implemented delayed starts, whether or not the responder was in the district when delayed starts were implemented, and how supportive the parents and community members were when initially moving to a delayed start model. The researcher preferred close-ended questions for the teacher questionnaires because he was hoping for a healthy response rate. This is common with questionnaires as they take participants less time and effort to respond. The researcher also included semi-open ended questions in the teacher surveys as a way to allow the responders an opportunity to provide open and honest responses regarding their personal and professional

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

opinions of the effects experienced since the implementation of delayed start times and the changes that have taken place in their respective schools.

Data Collection

Data was collected over a two month time period in the early winter of 2018. The researcher conducted the administrator interviews via telephone. See Appendix A for a list of administrator interview questions. After having conducted administrator interviews and having obtained permission, the researcher emailed a Google Forms survey to teachers from the four participating school districts. See Appendix B for a list of teacher survey questions. Teachers had four weeks to complete the survey.

Data Analysis

For the administrator interviews, the researcher collected qualitative data related to the responses. The researcher analyzed the data to look for themes. Once the themes had been interpreted, the researcher divided the response themes into categories. The categories were dependant upon the interview responses, and were grouped either by school district or by the nature of the response. The researcher reported on the findings using comparison tables.

The qualitative data from the open-ended opinion teacher questions was organized and then analyzed using thematic content analysis. This method aimed to find common patterns and themes across the responses. The qualitative questionnaire results were coded and categorized into positive and negative responses. Questionnaire response data was analyzed to identify general trends in attitudes toward delayed starts, as the results of action research is often

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

open-ended. From the findings, the researcher looked for themes, that were layered or organized to make for better reporting, dependant upon the results of the data collected (Creswell, 2015). The researcher used comparison tables, charts and graphs to report the teachers' findings.

Expected Findings

Prior studies indicated that there were many educational benefits and non-educational benefits related to delayed starts. Some of those benefits included improvements in cognition, better attendance rates, less tardiness, less reports of daytime sleepiness, and reduced numbers of teen motor vehicle accidents. However, what these studies had failed to provide is the qualitative feedback related to the practicality of delayed starts. While it was expected that districts would have slight increases in attendance and decreases in their students tiredness since delayed starts have been implemented, the researcher instead focused on how the administrators and teachers felt about delayed starts, as well as the benefits and challenges they had experienced since changing their school day start times. Therefore, the researcher expected to hear from administrators how they have had challenges related to shared staff, as well as vocational schools. The researcher expected to find that transportation costs had increased in districts that chose to adjust only the start times for their high school students. The researcher expected to hear from the teachers that students, coaches, and advisors have complained about the effects delayed starts have on after-school student extra-curricular activities. The researcher expected that teachers would also report that some parents and community members were reluctant to move to delayed start times. The researcher expected that districts have had to consider adding

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

in lighting for athletic fields, as delayed starts (and therefore later school departure times) would allow less practice and games times after school. It was expected that transportation directors have had to change some busing routes to ensure that young students were not getting off the bus in the dark, especially in the winter, due to later departure times.

Regarding the benefits of delayed starts, the researcher also expected that administrators and teachers would convey how much the students prefer the delayed start times. The researcher expected the teachers to report how pleased they are with additional morning planning time. It was also expected that teachers would report less observed student sleepiness, especially in the early morning classes. Lastly, dependent upon the interview and survey results, the researcher expects the findings of this study may encourage or discourage other Maine school districts to implement delayed start times.

Potential Issues and Weaknesses

Interviews have the potential to be very time-consuming. Since the researcher did not know any of the interviewees, there was no incentive for the interviewees to participate. In addition, the selected sample size of participating school districts (five) was small, as the number of Maine schools that have recently become delayed start schools is small. Lastly as Choi and Pak (2005) noted, while questionnaires provide no danger of interview bias, it is sometimes the case with interviews that the interviewees feel pressured, consciously or unconsciously, to respond in the fashion that they believe the interviewer wants.

While questionnaires are typically quick and easy to analyze, often the questionnaires can have a lot of problems. For example, unlike interviews, researchers do not fully know whether

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

or not the respondent understands the questions being asked. Secondly, unlike interviews, the amount or percentage of responses is sometimes unknown. Questionnaires often times have low return rates. The researcher was hoping for a minimum of a 30% response rate.

Another problem associated with questionnaires is that often, the responses the researcher receives back are from those that have either a really positive viewpoint or a really negative viewpoint of the subject. Those that are most likely unbiased typically choose to not respond. In this case, the researcher knew very few of those invited to participate in the study, therefore, the respondents had little incentive to respond to the questionnaires (Creswell, 2015).

The researcher did not ask for quantitative data regarding test scores. However, the researcher did inquire about attendance and tardiness data. Unfortunately, at the time of the study, these reports were not available as each of the participating districts were still compiling their own data.

Responses were analyzed to determine whether or not there was a relationship regarding the amount of time participants had been in their district, benefits experienced since delayed starts were implemented, complications related to delayed starts, community support, and the types of questions school districts that are considering delayed starts should contemplate prior to the implementation of delayed starts.

Results

The purpose of this mixed-methods study was to determine the impacts delayed starts have had in each of the five participating school districts, all of which were located in coastal regions of mid-to-Southern Maine and have modified their daily school schedules to allow for

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

later start times. Specifically, the study focused on the perceptions of impacts experienced by students, staff, and community members in each of the selected districts.

Data for the study was collected via two methods; the first consisted of qualitative phone interviews (Appendix A) with administrators from each of the five participating school districts. Each of the administrators were either a superintendent, a high school principal, or held both positions at the time the research was being conducted. The second method was a mixed-methods survey (Appendix B) of all teachers in each of the five participating schools. In total, 322 teachers were invited to complete the surveys, with 97 having responded, which represents a 30.1% response rate. One of the school districts, District E, was unwilling to allow their staff members to be surveyed as they are still in the process of gathering data themselves and preferred that their staff not participate in this phase of the study. Their principal, however, did partake in a qualitative telephone interview. These districts were identified in 2016 and 2017 newspaper articles regarding delayed starts in Maine schools.

Specifically, the researcher sought to discover:

What benefits have been experienced after having implemented later start times?

What challenges have been experienced after having implemented later start times?

How do parents and community members feel about later start times?

Administrator Responses

As part of the study, the researcher asked each of the participating administrators to provide their current and previous school start times, as well as the time their school day ends.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

The results, listed in Table 2, indicate that in most of the participating districts, the length of the school day remained very similar after delayed starts were implemented.

Table 2
A Comparison of Start Times and Dismissal Times

Maine School District	Previous Start Time For High School	Current Start Time For High School	Previous End Time For High School	Current End Time For High School	Change In Length of School Day (m) = minutes
District A	7:30 a.m.	8:10 a.m.	1:50 p.m.	2:25 p.m.	+5m
District B	7:35 a.m.	8:35 a.m.	2:00 p.m.	2:45 p.m.	-15m
District C	7:30 a.m.	8:00 a.m.	2:00 p.m.	2:30 p.m.	No Change
District D	7:30 a.m.	8:30 a.m.	1:45 p.m.	2:40 p.m.	-5m
District E	7:40 a.m.	8:10 a.m.	2:15 p.m.	2:45 p.m.	No Change

Administrator Reported Benefits Attributed to Delayed Starts

While the reported amounts of initial challenges were varied, each of the five school administrators reported that the changes to later start times were overall very positive and that they would not want to return to their previous start times. Each of the five administrators reported that they had experienced minimal disruptions, had limited amounts of complaints from staff, students and the communities, and three of the administrators reported that the students prefer the delayed start times, when compared with the previous school start times.

Amongst the five administrators, the most commonly cited benefit of having moved to later start times was how much students preferred the later times. In each of the five districts, administrators claimed that despite some initial questions, their students, staff, and communities

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

as a whole, now support delayed start times. When asked if stakeholders in District D would ever consider returning to their old schedule, the administrator responded “No. Never. And I wouldn’t be supported by anyone even if I did suggest it. The majority of people seem quite happy with the change.”

In District E, the principal stated the staff was hesitant at first, but that after four months of implementation, it appeared that most staff members are now happy with the change. According to the administrator, District E also plans to survey their staff in the spring of 2018 for the purpose of gathering additional feedback. The administrator stated that their students have reported “the beginning of the day being easier” for them. They claimed that students “seem to be in favor of the scheduling change and have cited being less tired for their morning classes.”

The administrator for District B claimed that students were originally opposed to the concept of changing schedules. The students cited potential negative impacts to athletic practices and competitions, as well as other after-school activities as being their primary concern. The administrator said that these concerns were all addressed with the students and “everything has worked out well so far.” According to their administrator, data shows that “both tardies and absences appear to have decreased one to two percent” in District B since the implementation of delayed starts. These findings aligned with those of Keller (2015), who found that attendance in Kentucky schools improved by 3.2% after delayed starts were implemented. The District B administrator also believed that the decreases are due to the later start times, although they said they cannot be certain. Several of the other participating districts were in the process of collecting similar data on absences and tardiness rates. Each of the five district administrators stated that they will be reviewing their tardy and absences reports prior to next school year to

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

determine whether or not delayed starts have resulted in any changes. To this point, none of that information has been analyzed.

Other reported benefits listed by administrators included “healthier for students,” “less crowded busses in the mornings,” “reports of homework being completed at a higher rate,” and “students and parents don’t have to rush in the morning.” Overall, the five administrators listed very similar benefits related to delayed starts, and as the administrator from District C stated, “the benefits far outweigh the few problems we’ve encountered.”

Administrator Reported Challenges Related to Delayed Starts

According to administrators, the most commonly cited challenge associated with later start times was in relation to athletics and other after-school activities. While only two of the five administrators reported a significant adjustment period, four of the five administrators indicated that their districts had to alter the start times for practices. Administrators from Districts D and District E indicated that some of their students now miss more class time at the end of the day in order to attend away athletic competitions. This is particularly common in the fall and spring athletic seasons when the vast majority of sports sanctioned by the Maine Principals Association take place outside (MPA, 2018).

To account for missed class time, the administrator from Districts E stated that they will be implementing an RTI period at the end of the day. They said “Once we implement this, those students would only miss RTI time, not class time.” The administrator from District D had similar thoughts, and said that they “are currently exploring ways to alleviate students missing class time at the end of the day.” Two administrators mentioned that their districts had to

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

implement new rules or policies that prevent coaches from practicing in the mornings, as many of their coaches tried to take advantage of the later start times by holding morning practices.

Each of the administrators that encountered this situation indicated that morning practices would run counter to the purpose of delayed starts, and therefore only be allowed in extreme cases, such as scheduled ice time for ice hockey or pool time for swimming, as ice time and pool times can be difficult to come by in some communities.

Administrators from Districts A, B, and C suggested that they may have experienced limited challenges related to athletics because they all belong to the same athletic conference. They each indicated that their athletic directors were instructed to meet for the purposes of discussing the implementation of delayed starts in their region, as well as how those changes would impact start times for games, matches and competitions. This cooperative approach appeared to have reduced the number of challenges experienced in these schools and they each suggested that other districts that are looking to implement delayed starts, do the same, when possible. As the District B administrator reported, “We’ve experienced very few issues with after-school activities, and any that we did encounter were addressed early.” The administrators from Districts A, B, and C also explained that the distances their extra-curricular teams, clubs and groups have to travel is very minimal when compared to other school districts, so that allowed them to move the end of the school day back to accommodate delayed start times, while still not adversely impacting the start times of games and competitions.

Districts D and E reported belonging to athletic conferences that are located in regions of the state in which delayed starts have not yet become common. Therefore, the reported challenges associated with after school activities in these districts, because other

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

conference-member schools still wanted to start activities at the “old” times. Their administrators expressed the necessity of changing school schedules, practice times, and in the case of District E, the possibility of budgeting for outdoor lighting for fall and spring sports, in order to account for later practice start times.

In addition to after school activities, another challenge that administrators conveyed was their participation in regional vocational schools. Administrators from Districts A, C, and E, all expressed challenges related to scheduling and busing of students who attended shared regional vocational schools. Specifically, the superintendent of District A reported that due to changes in their busing schedules, in order to accommodate delayed starts, their vocational students now miss approximately 20 minutes of instruction each morning at the regional center. Additionally, the administrator from District C said that their district expected to experience an undetermined increase in their transportation budget due to now having to transport their vocational students on their own buses, as they had previously shared the busing of those students from non-delayed start school districts. The District C administrator reported that they will wait until the end of the school year to determine the additional transportation costs, but they expect it will be “low.”

While the administrator from District B explained that their district had experienced no additional regular transportation costs, they did have to revamp their normal busing routes to accommodate the schedule changes. This was a common theme amongst administrators as four of the five administrators voluntarily suggested making Transportation Directors members of any committee investigating delayed starts. Meanwhile, the administrator from District A reported that while they have experienced increases in transportation costs for the 2017-18 school year, it has not been determined what factors have led to the increase. To this point, district leaders are

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

not convinced that the costs are due to the change to a later start time, but will continue to study the impact to transportation costs.

None of the district administrators reported traffic-related issues caused by delayed starts, however, after the school year, District A has plans to meet with the local police department to determine if there have been any significant changes to teen traffic accidents, as they relate to school. None of the other school administrators reported plans to do the same, but administrators were not specifically asked about this matter.

Administrator-Provided Advice Related to Implementation of Delayed Starts

While not listed as a benefit, four of the participating administrators strongly emphasized the importance of providing opportunities for all stakeholders to ask questions prior to adopting delayed start times. All five districts allowed opportunities for students, staff members, parents, communities members, medical experts, and/or other stakeholders to ask questions and voice their support or their concerns. They said that allowing opportunities for stakeholder input, alleviated a lot of potential future concerns and helps build a stronger consensus. While Districts A, C, D, and E all had “some” level of input from stakeholders, the administrator from District B said “We held several informational nights in which parents and community members were invited. No one showed up. But, we did have a parent/community group as part of the committee that originally began looking at delaying the start times, so that could be why.” All five districts administrators suggested that schools considering delayed starts should begin their research at least a full year prior to implementation.

Also of note, administrators from Districts A, C, and D each claimed that they preferred

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

later start times than the ones their districts implemented. A common theme noted was that change can be difficult to implement, but that they may consider delaying start times even later once their communities have had an opportunity to get used to the new changes.

Demographics of Participating Teachers

In order to better understand how teachers feel about delayed starts, the researcher, after having obtained permission from administrators from the participating districts, e-mailed a Google Survey to teachers from the participating schools. The lone exception to this was District E whose superintendent preferred that their staff members not be surveyed, as they were in the midst of conducting a research study in their own district. Their superintendent did not want this study to interfere with theirs.

In total, the researcher sent out 322 Google Surveys to teachers from Districts A, B, C & D, with 97 participating respondents. This resulted in a 30.1% total response rate, with District C having the highest response rate percentage at 41.2%. District A had the lowest response rate percentage, with a 22.4% response. See the Table below for all response rates:

Table 3
Total Response Rates and Percentages, by School District

School District	Number of District Teachers Invited to Participate	Number of District Teachers to Respond to Survey	Percentage of District Teachers to Respond to Survey
District A	125	28	22.4%
District B	90	27	30.0%
District C	85	35	41.2%
District D	22	7	31.8%

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

District E	N/A	N/A	N/A
------------	-----	-----	-----

Of the 97 teachers who participated in study, the vast majority, identified as “General Education Teacher.” The researcher was unable to group responses by department or type of teacher, as the questionnaire was not created in a way to distinguish between General Education Teachers, Special Education Teachers, Allied Arts Teachers, and Others. Table 3 breaks down participating teachers by specialization. Additionally, 85 of the 97 respondents said they were in their districts when delayed starts were first implemented.

Table 4

Breakdown of Number and Percentages of Participating Teachers by Specialization

School District	General Education Teacher	Special Education Teacher	Allied Arts Teacher	Other
District A	22	3	1	2
District B	19	4	1	3
District C	21	4	1	9
District D	3	2	2	0
Total Number of Respondents	65	13	5	14
Combined Percentage of Respondents	67.01%	13.40%	5.15%	14.43%

Of the 97 teachers who participated in this study, the majority of teachers identified as having 10 or more years experience in their current position. Teachers with 0-3 years experience made up the second largest percentage group, with teachers of 7-9 years experience and those

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

with 4-6 years experience having made up the third and fourth largest percentage groups, respectively.

See *Figure 1*.

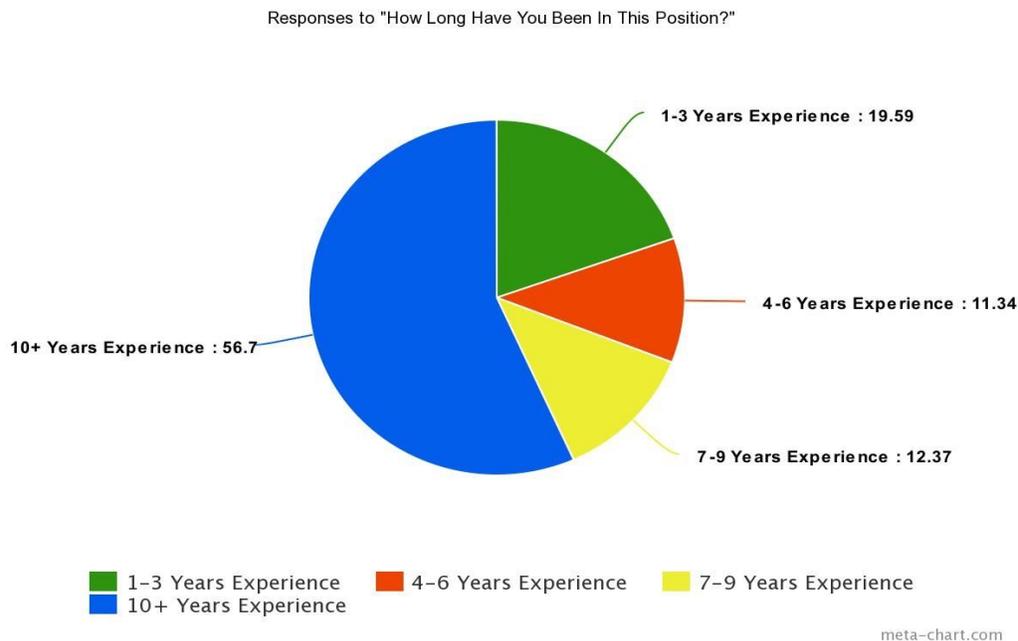


Figure 1. Teacher Responses to “How Long Have You Been In This Position?”

Teacher Reported Academic Benefits Attributed to Delayed Starts

Overall, 72 of the 97 teachers (74.22%) who responded to the survey reported at least one academic benefit attributed to delayed starts (Figure 2). This is slightly lower than the 100% of interviewed administrators who reported academic benefits related to delayed starts. The remaining 25.78% of teachers reported experiencing no benefits related to delayed starts. Of the reported academic benefits, “Students More Alert/Focused in the Morning” was the most common, with 46 of 97 respondents having listed it as a benefit of delayed starts. As one teacher

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

from District B reported, “Students are more alert during block one classes, which allows them to engage with the material more effectively.” Another teacher, from District added “Students are quicker and deeper with their thinking in the mornings.”

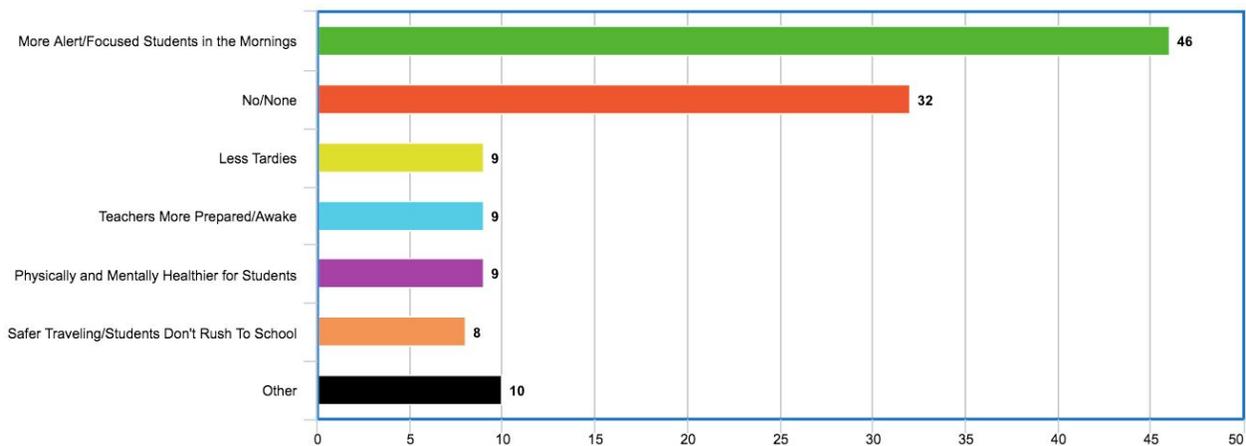


Figure 2. Combined Teacher Responses to “Benefits Attributed to Delayed Starts”

Another benefit of delayed starts, as reported by teachers, was lower student tardiness rates. Overall, nine of the 97 respondents claimed that students were less likely to be tardy after having moved to a delayed start time. Just over nine percent of respondents reported that tardiness rates had improved, with teachers from each of the four participating, surveyed school districts having listed this as a benefit. As previously mentioned, each of the five districts will compile absence and tardiness reports after the 2017-18 school year.

Teacher preparedness and alertness was another common response. Nine of 97 respondents claimed that teachers, like students, benefit from later start times. As one respondent from District D answered, “While I know there are many important benefits for students, I feel like teachers have equally benefited. I am not only more rested, but more

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

prepared for each day. The difference is night and day.” In another response, a teacher from District B wrote, “I still report to school at the same time I did before delayed starts, but I now have more time to prepare for my day. In turn, I think that makes me a better teacher.”

While all five of the participating administrators cited scientific and medical research related to student health as one of their reasons for supporting delayed start times, only nine of the 97 respondents listed this as a benefit. One teacher from District C noted,

“We did a lot of research prior to implementation. I learned that variations in sleep patterns, including number of hours slept, quality of sleep, and sleep-wake times, can have a profound impact on student health and performance. I believe that our school times are now more in sync with students’ biorhythms, so students are more alert and simply better able to engage and focus.”

A teacher from District D also cited student health, writing “We know that our new start times align better with students’ circadian clocks.” Other teachers simply noted “student health,” without providing specific details.

Other benefits provided from participating teachers included “Students don’t have to rush to school, safer traveling, homework is done better/more often, easier for parents/families, time for clubs to meet, more time for students to meet with teachers, students feel valued, and improved attendance.”

Of the school districts that allowed teachers to take part in this study, Districts C and District D teachers were the most likely to list academic benefits related to delayed starts (Figure 3). More than eighty-seven percent of teachers in Districts C and D reported benefits. District B teachers were the least likely to provide at least one academic benefit, with only 44.4% having

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

done so. In District A, 60.8% of teachers listed at least one academic benefit.

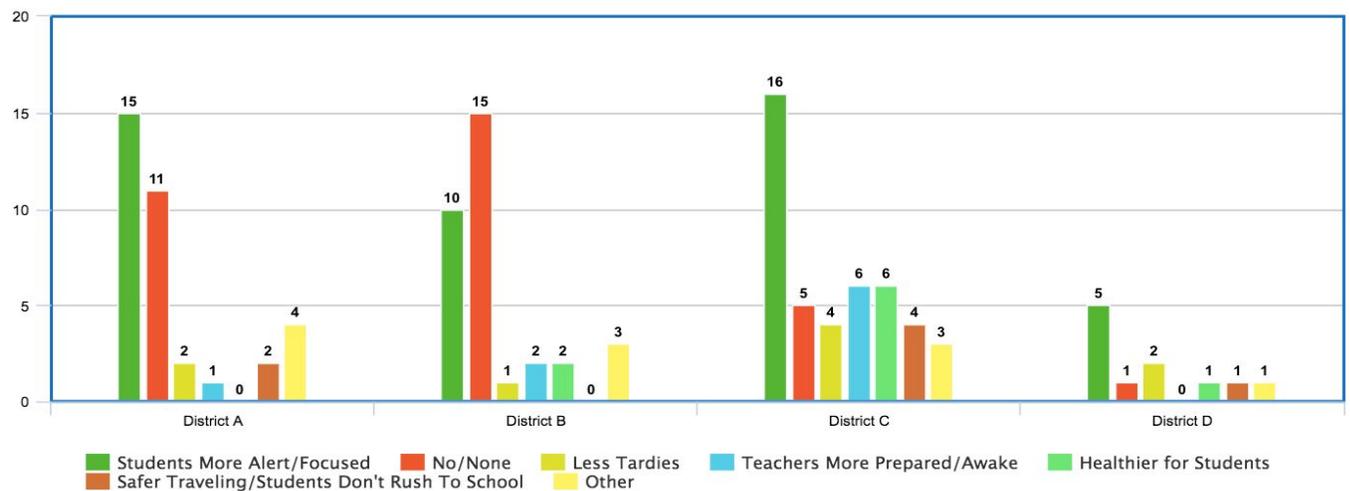


Figure 3. Total Number of Identified Academic Benefits, Per District

Note: Surveyed teachers were asked to list two academic benefits associated with delayed starts. Therefore, the number of benefits provided is greater than the number of total respondents in each school district.

Of the 25 teachers who reported no observed academic benefits of delayed starts, 60% had 10 or more years teaching experience in their current position, while only two teachers with 0-3 years of experience reported no academic benefits (Figure 5). While teachers with 10+ years experience and teachers with 4-6 years experience were slightly more likely to find no academic benefits of delayed starts, teachers with 0-3 years experience and teachers with 7-9 years experience were slightly less likely to find no benefits.

Table 5
Percentage of Teachers, by District, to Report No Academic Benefits of Delayed Starts

Years of Teaching Experience	District A	District B	District C	District D	Percentage of Teachers by Years of Experience	Percentage of Teachers Who Reported No Benefits of Delayed Starts

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

0-3	5	4	8	2	19.59%	8%
4-6	3	5	2	1	11.34%	20%
7-9	5	2	5	0	12.37%	12%
10+	15	16	20	4	56.70%	60%

Teacher Reported Academic Challenges Attributed to Delayed Starts

As with the reported benefits attributed to delayed starts, teacher-reported challenges varied by school district. More notably however, when compared to reported benefits, the challenges cited by teachers were much greater in number. While all five of the participating administrators identified challenges, each of the five seemingly believed that the benefits far outweighed the challenges and that most of the challenges have been addressed or are in the process of being addressed. Teacher responses, however, indicated that many challenges and concerns still exist. In general, while the majority of teachers agreed that there were many academic benefits associated with delayed starts, 63.9% of surveyed teachers listed at least one existing delayed start-related challenge in their school district.

Of the challenges cited by teachers, the most common response was “students missing class time for extracurricular activities.” Twenty-three of the 25 teachers who reported it as a challenge, worked in either District B or District C. As one teacher from District C reported “Sports dismissals take students out of last period classes with more class time left than before we had a late start.” Another teacher, this one from District B commented “We were told athletes would be excused rarely, and it happens daily. Students are constantly being dismissed

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

for games or even practices.” No teachers from District A listed “students missing class time for extra-curricular activities” as a challenge. See *Figure 4*.

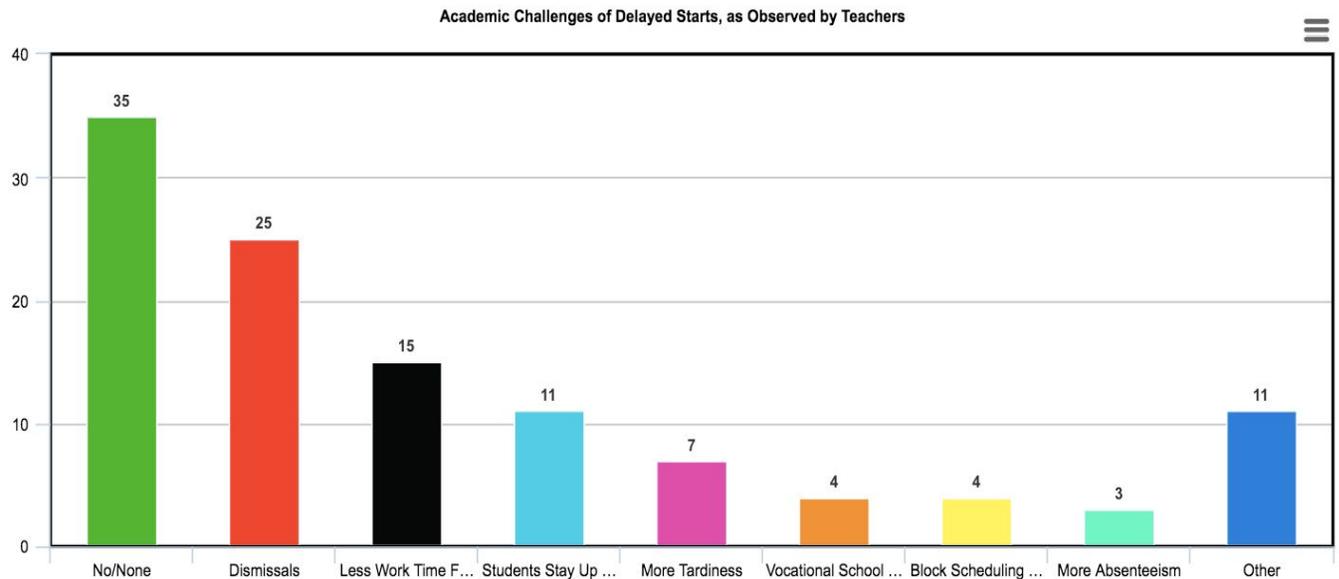


Figure 4. Academic Challenges of Delayed Starts, as Observed by Teachers

Another challenge reported by teachers was “Student complaints related to after school activities/work.” This challenge was particularly common amongst teachers in Districts A, C and D, as 11 of the 12 concerns came from these three districts. One response from a District C teacher read “Students are...less available for after school help, remediation, and make-up work; sports and club practices now start immediately after school. We used to have a 30-45 minute buffer.”

“Students staying up later” was the fourth most common response to this question. While this challenge was listed only eleven times, 57% of the respondents from District D cited this as

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

a concern. One teacher from District D wrote “Students now just stay up later, so some still come to school tardy or groggy.” By comparison, only 2.8% of District C teachers listed “students staying up later” as a concern.

The majority of the other challenges cited were those specific to a particular district. For example, in District B, “More tardiness,” was listed on 25.9% of the surveys. By comparison, none of the teachers from the other three districts listed tardiness as a challenge created by delayed starts. By contrast, many teachers in Districts A, C, and D had listed “less tardiness” as a benefit of delayed starts.

Similarly, teachers in District A listed “Challenges related to vocational center” as a common challenge. In all, four teachers from this district noted that delayed starts had presented challenges for both them and/or their students who also attend the regional vocational school. The most common reason cited was that the other sending schools have earlier start times and therefore the schedules do not align. According to both their teachers and administrator, this has caused some vocational students from District A to be dismissed early from other classes in order to catch the bus to the vocational school. It should be noted however, that the administrator from District A said in their interview, that they are already working on a plan to alleviate this problem for the 2018-19 school year.

Other challenges reported by teachers included increases in absenteeism, transportation challenges, and student fatigue. Additionally, teachers disclosed that they had less time allocated for lunch and after school appointments. There were also reported challenges associated with students getting dropped off the bus when it is dark.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Challenges Delayed Starts Cause Parents and Community Members, as Reported by Teachers

As part of this research study, teachers were asked to share and explain some of the observed challenges that delayed starts can cause for parents and other community members. The most common responses received were “No”, “None”, or “Not Sure.” Forty-one of the 82 respondents who answered this question, said that they could not specify a challenge delayed starts have caused for parents or community members in within their district.

From those teachers that did list challenges, transportation issues were the most common. Fourteen teachers reported that it was now more difficult for parents to get their students to or from school. As one teacher from District A noted “Parents had routine travel times that had been fixed for years. Any time a district plays with such things, it creates impacts on parents and community members.” A teacher from District D agreed, adding “Some parents have complained about having to change their work schedules to drop their child off at school because of the new start time.” By comparison, other teachers disagreed with this concept. Three teachers, all of District D indicated that parents now have more time in the mornings. One claimed “As a teacher and parent who lives in the community in which I work, I appreciate having more time to get to school. Our old [start] time forced parents and kids to rush in the morning. I’ve heard from other parents who feel the same way.”

Another reported challenge that delayed starts can have on parents and community members involved child care. As one teacher from District B wrote,

“We live in a very poor city, and many older children were required to watch their younger siblings after school. That can no longer happen because the younger children get out of school earlier. I have students dismissed by parents so their high school

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

children can be home and get the younger siblings off the bus, and care for them while the parent(s) work. We do have after school care, at a reasonable price, but the after care still cost money.”

In all, 11 teachers listed child care concerns as a challenge created by delayed starts.

Several teachers agreed that later start times have created issues for after school activities. In all, 10 respondents listed newfound challenges related to after school activities, most of which are related to athletics. One teacher from District A noted “Athletics start later, which is problematic as days get shorter.” A teacher from District B agreed, writing “Delayed starts have made it more difficult for students who...are involved in extracurricular activities. Game times are sometimes later, which means students get home later.”

Additional parent and community challenges listed by teachers included less time for students to work after school, disruptions to community traffic patterns, and difficulties for parents in getting their children to and from school. See *Figure 5*.

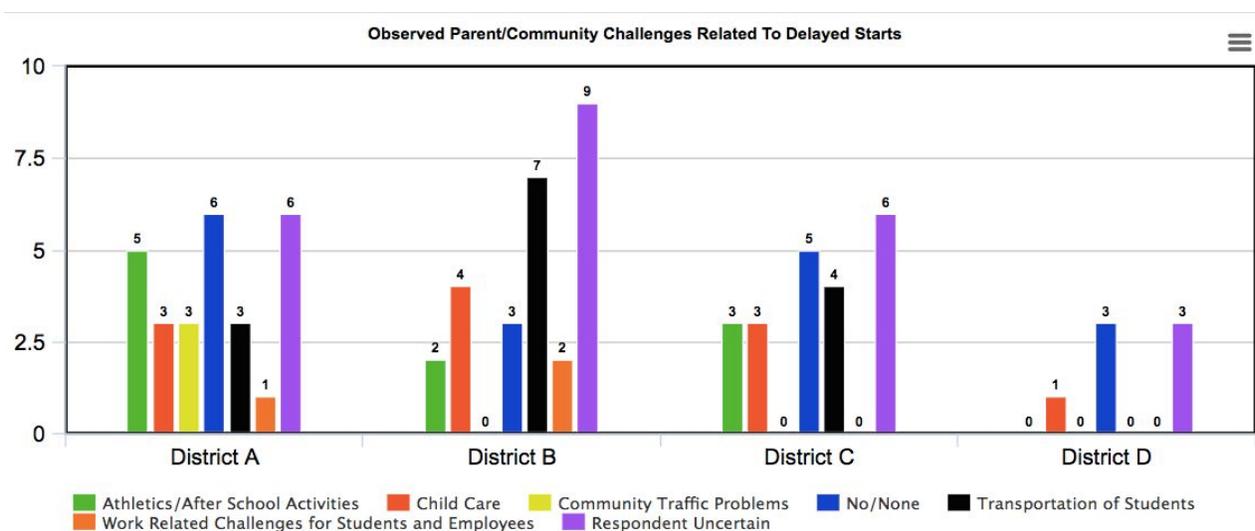


Figure 5. Observed Parent/Community Challenges Related To Delayed Starts

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Overall, half of the 82 respondents had difficulties listing a single problem that delayed starts have caused for parents or members of their school district's community. While in some districts this may be because of the limited number challenges experienced since delayed starts were implemented, in others, it may be because teachers don't know how parents and community members have been affected. Another reason could be that teachers would prefer that parents and community members have the opportunity to answer this question more directly.

Discussion

Delaying school start times for adolescents has been proposed as a policy change in many Maine school districts. The primary purpose for the change is to address insufficient sleep among adolescents. Researchers have indicated that teenagers are a largely sleep-deprived population, therefore, changes in start times has the potential to improve students' academic performance and improve health. Nearly all studies to date provide evidence that delaying school start times accomplishes the goal of increasing sleep duration among students, primarily by delaying the time they wake up. One study revealed a significant increase in sleep duration even with relatively small delays in start times of half an hour (Wolfson & Carskadon, 1998). For students, later school start times also generally corresponded in improved academic performance (Keller, Smith, Gilbert, Bi, Haak, & Buckhalt, 2015), improved attendance (Wahlstrom 2002), less tardiness (Wahlstrom, 2002; Wolfson & Carskadon, 1998), less daytime sleepiness (Wolfson & Carskadon, 1998), improved memory recall (Bauml, Holterman, & Abel, 2014), better moods (Owens, Belon & Moss, 2010), fewer motor vehicle crashes (Danner &

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Phillips, 2008), and better overall physical and mental health (Maume, 2013). Although not all studies found that later start times corresponded to improved academic performance, no studies found a negative impact of later school start times on academics.

In addition, organizations such as the Family Sleep Institute, National Highway Traffic Safety Administration, American Academy of Pediatrics, National Education Association, and the Center for Disease Control and Prevention, have all, to some degree, endorsed the concept of delaying the start of the school day. Therefore, research results such as those presented in this study, should be dispersed to school administrators, teachers, parents, and other stakeholders, so that they can be fully informed as to the benefits of delayed starts and consider whether or not delayed starts would work in their districts. As this study indicates, the implementation of delayed starts is not always simple.

One of the districts that were originally scheduled to take part in this study was removed just prior to collection of data, due to the fact that the high school principal was notified that their contract would be non-renewed, partially over issues related to the implementation of delayed start times in that school district. This occurred the same week this principal was scheduled to be interviewed for this research study. The principal claimed that the initiative lacked support from the staff, students, and community. After having reported this to the district superintendent, the principal was notified that their contract would not be renewed at the end of this school year.

Prior to deciding whether or not to adopt later start times, school districts should consider: the effects they may have on transportation costs, the impact the change may have on regionalized vocational schools and the students that attend these schools, ramifications on extracurricular activities, effects on students with after-school jobs, challenges created for

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

parents, impact on students being dismissed early for school activities, as well as other factors that may be unique to their school and community.

Overall, the findings of this study indicated that while administrators recognize that challenges may exist, in their collective opinions, the benefits of delayed starts far outweigh the challenges. Teachers are also generally supportive of delayed starts. Of teachers who participated in this study, 74.2% could cite at least one academic benefit and many stated that they would not be receptive to returning to earlier start times. However, 25 of the 97 respondents could not list a benefit, which indicated that teachers, while generally supportive, are less so than are the administrators. Additionally, participating teachers provided many more challenges than did the administrators.

Implications of Research

Many questions remain, such as the issue of how late is late enough? Much of the focus has been on high school students, but biological changes begin earlier, so further research into middle-school students is warranted. As Keller, Smith, Gilbert, Bi, Haak, & Buckhalt (2015) discovered, associations between early school start times and poorer school performance can begin as early as elementary school. More qualitative research about overcoming obstacles to delaying school start times would also be valuable.

Implications for Practice

Educational leaders need to discuss how the sleep needs of students corresponds to improved academic performance, better attendance, less tardiness, less reports of daytime

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

sleepiness, improved memory recall, better moods, fewer adolescent motor vehicle accidents, and enhanced overall physical and mental health. Parents need to become better informed about the importance of sleep and how to support better sleep habits at home. Finally, the most successful examples of Maine schools that have transitioned to a delayed start time have found ways to include not only administrators, teachers and parents, but they've also included community health care professionals, public safety officials, school athletic directors, transportation directors, and other stakeholders.

Conclusion

So, while evidence strongly supports the of benefits of delayed starts, educational leaders must consider all challenges that they may encounter prior to implementation. The effectiveness and popularity of delayed starts depends on the ability of the change-agents to address the various challenges prior to implementation. In theory, the concept of delayed starts is well supported. In some Maine school districts, however, the actual implementation of delayed starts has proven to be much more difficult.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

References

- Amschler, D.H., & McKenzie, J. F. (2010). Perceived sleepiness, sleep habits, and sleep concerns of public school teachers, administrators, and other personnel. *American Journal of Health Institution, 41*(2), 102-109. <http://dx.doi.org/10.108019325037.2010.10599134>
- Bauml, K.T., Holterman, C., & Abel, M. (2014). Sleep can reduce the testing effect: It enhances recall of restudied items but can leave recall of retrieved items unaffected. *Journal of Experimental Psychology, 40*(6), 1568-1581. <http://dx.doi.org.ursus-proxy-6.ursus.maine.edu/10.1037/xlm0000025>
- Bulletins. (2018). In *MPA*. Retrieved April 2, 2018, from <http://www.mpa.cc/index.php/interscholastic-division/bulletins>
- Carroll, A. (2017, September 13). The Economic Case for Letting Teenagers Sleep a Little Later. *New York Times*, p. B3.
- Choi, B. & Pak, A. (2005). A Catalog of Biases in Questionnaires. *PubMed Central. (2)*1, A13.
- Creswell, J.W. (2015). *Educational Research (4th ed)*. Boston: Pearson.
- Danner, F. & Phillips, B. (2008). Adolescent sleep, school start times, and teen motor vehicle crashes. *Journal of Clinical Sleep Medicine, 4*(6), 533-535.
- Gillen-O'Neel, C., Huynh, V.W., & Fuligni, A.J. (2013). To study or to sleep? The academic costs of extra studying at the expense of sleep. *Child Development Journal, Volume 84*(1), 133-142. doi: 10.1111/j.1467-8624.2012.01834.x
- Keller, P.S., Smith, O.A., Gilbert, L.R., Bi, S., Haak, E.A., & Buckhalt, J.A. (2015). Earlier school start times as a risk factor for poor performance: An examination of public schools in the commonwealth of Kentucky. *Journal of Educational Psychology, 107*(1), 236-245. <http://dx.doi.org/10.1037/a0037195>
- Kirby, M., Maggi, S., & Angiulli, A. (2011). School start times and the sleep-wake cycle of adolescents: A review and critical evaluation of available evidence. *Educational Researcher, 40*(2), 56-51. <http://dx.doi:10.3102/0013189X11402323>
- Maume, D.J. (2013). Social ties and adolescent sleep disruption. *Journal of Health and Social Behavior, 54*(4), 498-515. <http://dx.doi.10.1177/0022146513498512>
- McKeever, P.M & Clark, L. (2017) Delayed high school start times later than 8:30am and impact On graduation rates and attendance rates. *Sleep Health, 3*(2), 119-225.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

<https://doi.org/10.1016/j.sleh.2017.01.002>

- Owens, J.A., Belon, K., & Moss, P. (2010). Impact of delaying school start time on adolescent sleep, mood and behavior. *Archives of Pediatric and Adolescent Medicine*, *164*(7), 608-614. <http://doi:10.1001/archpediatrics.2010.96>
- Smaldone, A., Honing, J.C., & Byrne, M.W. (2007). Sleepless in America: Inadequate sleep and relationships to health and well-being of our nation's children. *PEDIATRICS* *119*(1). doi.10.1542/peds.2006-2089F
- Vorona, R.D., Szklo-Coxe, M., Lamichhane, R., & Ware, J. (2014). Earlier school start times may be tied to teen driving accidents. *Journal of Clinical Sleep Medicine*, *13*(11), 1169-1177. <http://dx.doi.org/10.5664/jcsm.4192>
- Wahlstrom, K. (2002). Changing times: Findings from the first longitudinal study of later high school start times. *NASSP Bulletin*, *86*(633).
- Wolfson, A.R. & Carskadon, M.A. (2005). A survey of factors influencing high school start times. *NASSP Bulletin*, *89*(642). doi:10.1177/019263650508964205
- Wolfson, A.R. & Carskadon, M.A. (1998). Sleep scheduling and daytime functioning in adolescents. *Child Development*, *69*(4), 875-887.

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Appendix A: Interview Questions For Administrators

Interview Questions

The eight questions that will be presented to administrators, via telephone interview are:

1. As an administrator, can you share your thoughts on delayed start times ?
2. What do you see as drawbacks of delayed start times?
3. What do you see as benefits of delayed start times?
4. Has your opinion of delayed starts changed over time?
5. Were you in the district when delayed start times were implemented? If yes, in what capacity?
6. Do you know the primary reason why your district moved to delayed starts?
7. Do you support delayed start times?
8. Is there anything else you want to share about delayed start times?

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Appendix B: Survey Questions For Teachers

Survey Questions

The eight questions that will be presented to teachers, via Google Forms are:

1. What is your position at the high school?
 - a. General Education Teacher
 - b. Special Education Teacher
 - c. Allied Arts Teacher
 - d. Other

2. How long have you been in this position?
 - a. 0-3 years
 - b. 4-6 years
 - c. 7-9 years
 - d. 10+ years

3. In what year did your district implement delayed start?
 - a. I don't know
 - b. 2017
 - c. 2016
 - d. 2015
 - e. 2014
 - f. Prior to 2014

4. Were you in the district when delayed starts were implemented
 - a. Yes
 - b. No

5. Can you list two academic benefits of delayed starts?

6. Can you list two academic challenges associated with delayed starts?

7. Have delayed starts presented any challenges for parents or community members?

8. Is there anything else you'd like to share about delayed start times?

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Appendix C: Administrator Interview Consent

You are invited to participate in a research project being conducted by Timothy M. Tweedie, a graduate student at the University of Maine at Farmington. The purpose of the research is to determine the impact that delayed starts can have in Maine high schools.

What Will You Be Asked to Do?

Administrators will be asked to participate in a telephone interview for the purpose of gathering information regarding the impact delayed starts have had in your district. The interview will last approximately 10-15 minutes. The purpose of the interviews is to determine the positive and negative effects delayed starts has had within your district. In addition I would like to survey teachers in the district to learn more about their perspectives.

Risks

The time and inconvenience of being interviewed or the time and inconvenience of answering survey questions may be risks of participating in the study.

Benefits

There are no direct benefits to you from participating in the study. However, as a participant you may enjoy knowing that your feedback could help other Maine schools if/when they were to implement delayed starts. Aside from this benefit to the participant, this research will help me understand more about how delayed starts can be successfully implemented and the challenges associated with delayed school start times.

Confidentiality

Personal information such as names and job titles will remain confidential, as will information about the school district in which you work. The telephone interviews will be recorded for the purpose of data analysis, and will be destroyed after their use in this research study. The documents and files from this study will all be kept on a password protected laptop and will not be shared with anyone other than the person conducting the study. All data from the study, including the participant key, will be kept for six months and then destroyed.

Voluntary

Participation is voluntary. If you choose to take part in this study, you may stop at any time. You may skip any questions you do not wish to answer.

I fully understand the purpose of this research and the procedures to be followed. I understand that my records will be kept confidential, my participation is voluntary, and that I may withdraw at any time without penalty. I also recognize that I may skip any questions I don't wish to respond to. Results of this research will be shared in the form of one or more publications and verbal presentations. If you have any questions about this study, please contact me, Timothy M Tweedie at tim.tweedie@rsu29.org and (207) 694-2155. You may also reach the faculty advisor, Johannah Prince on this study at johanna.prince@maine.edu or (207) 778-7066. You may also

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

contact the Chair of the IRB, Dr Karol Maybury at karol.maybury@maine.edu.

By replying to this e-mail, indicating your willingness to participate in a telephone interview, I assert that I fully understand the above and give my consent to serve as a subject in this research. (If you would like a summary of the results, please make the request of the researcher at the contact given above).

(Date)

(Signature)

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Appendix D: Teacher Survey Consent

Dear fellow teachers,

I am conducting a research study as part of my graduate degree at the University of Maine Farmington. This research is part of my capstone course. The purpose of the research is to investigate the impacts of delayed starts in Maine Schools. For the purposes of this study, I am seeking teachers that are willing to take part in an eight question survey and I am hoping that you will choose to participate. Prior to consenting, please consider the following information.

What Will You Be Asked to Do?

Teachers will be asked to participate in a Google Forms survey. The purpose of the survey is to gather information regarding the impact delayed starts have had in your district. The survey consists of eight open and semi-close ended questions and should take 5-10 minutes to complete.

Risks

The time and inconvenience of being interviewed or the time and inconvenience of answering survey questions may be risks of participating in the study.

Benefits

There are no direct benefits to you from participating in the study. However, as a participant you may enjoy knowing that your feedback could help other Maine schools if/when they were to implement delayed starts. Aside from this benefit to the participant, this research will help me understand more about how delayed starts can be successfully implemented and the challenges associated with delayed school start times.

Confidentiality

Personal information such as names and job titles will remain confidential, as will information about the school district in which you work. The documents and files from this study will all be kept on a password protected laptop and will not be shared with anyone other than the person conducting the study. All data from the study, including the participant key, will be kept for six months and then destroyed.

Voluntary

Participation is voluntary. If you choose to take part in this study, you may stop at any time. You may skip any questions you do not wish to answer. If you agree to participate in the research study, please read the information below, then click on the link to open the survey.

I fully understand the purpose of this research and the procedures to be followed. I understand that my records will be kept confidential, my participation is voluntary, and that I may withdraw at any time without penalty. I also recognize that I may skip any questions I don't wish to respond to. Results of this research will be shared in the form of one or more publications and verbal presentations. If you have any questions about this study, please contact me, Timothy M Tweedie at tim.tweedie@rsu29.org and (207) 694-2155. You may also reach the faculty advisor,

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Johannah Prince on this study at johanna.prince@maine.edu or (207) 778-7066. You may also contact the Chair of the IRB at the University of Maine at Farmington, Dr Karol Maybury at karol.maybury@maine.edu.

By clicking on the link provided, I assert that I fully understand the above and give my consent to serve as a subject in this research. (If you would like a summary of the results, please make the request of the researcher at the contact given above).

THE IMPACTS OF DELAYED STARTS IN MAINE SCHOOLS

Appendix E: Local Administrator Consent Form

My name is Timothy M. Tweedie and I am a student at the University of Maine Farmington. I am interested in conducting a research study in the spring of 2018. I am interested in exploring the impacts that delayed starts have on students, parents and educators when implemented in Maine high schools.

I would like to send surveys to teachers who are working in Maine school districts that have implemented delayed starts. I would like to ask questions regarding their own experiences after having implemented delayed starts, as well as parent and students opinions on the matter. I would also like to interview administrators from school districts with delayed starts to inquire about their experiences.

I will not share identifiable data about specific students, parents or others involved in the study.

If you have any questions about this study, please contact me, Timothy Tweedie tim.tweedie@rsu29.org and (207) 694-2155. You may also reach the faculty advisor, Johanna Prince on this study at johanna.prince@maine.edu or (207) 778-7066.

Thank you for considering my request to conduct research, Timothy M Tweedie.

I have reviewed Timothy M Tweedie’s research plan for “Impact of Delayed Starts in Maine.” I give my consent to conduct this research in Houlton. I am aware that I may also ask to view the report at the end of the study.

Date

Name

Position in District/Site