THE IMPACT OF PARENT AND STUDENT ACCESS OF STUDENT INFORMATION MANAGEMENT SYSTEMS ON STUDENT ACHIEVEMENT

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Dec 6, 2010

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THESIS

Presented to the Faculty
of the University of Alaska Fairbanks

in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF EDUCATION

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Fairbanks, Alaska

December 2010

ABSTRACT

The introduction of online student information systems (SISs) has provided parents and students the opportunity to more closely monitor student academic performance. Two years after the implementation of an SIS, PowerSchool, in the Fairbanks North Star Borough School District, data indicates no significant increase in grade point average (GPA) despite significant increases in SIS utilization. System contacts increased during academic years 2008/'09 and 2009/'10 among populations of middle school and high school students while average GPAs remained essentially unchanged. However, comparisons between SIS contacts and GPAs revealed statistically significant correlations between the two variables, indicating some degree of connection between student/parent monitoring and academic performance. In addition, analysis of student records indicates a positive correlation between average GPAs and contacts recorded during an academic year; records with low GPAs reported fewer contacts with the SIS, with contacts increasing with GPA values. Thus, while families of higher-achieving students are more likely to utilize PowerSchool than lower-achieving students' families, the introduction of PowerSchool has had essentially no impact on promoting academic achievement.

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INTRODUCTION

Since the beginning of education, optimal student performance has been the desired result of many well-intentioned initiatives, movements, and experiments. The "No Child Left Behind" Act of 2001 holds as one of it's fundamental tenants the involvement of parents in their children's education as part of the equation leading to maximized student success in school (Bird, 2006). While there is little agreement in the academic world as to a universal definition for "parental involvement", the consensus is that monitoring grades and assignments is a major factor (Fan and Williams, 2010). To that end, along with the advances in technology, software, Internet infrastructure and personal access to computers and the Internet, numerous student information system (SIS) developers have marketed software systems such as PowerSchool to help parents access real-time information about their child. In promoting their products, software designers tout their programs as a convenient user-friendly means to encourage parental monitoring of their child's academic status and presumably thereby achievement. Research indicates that factors promoting parental involvement and student empowerment are well supported by features of many SISs. After several years of practical use, the opportunity presents itself to look back on the data to see if, in fact, the expectations are being realized.

Statement of the Problem

Since the implementation of PowerSchool in the Fairbanks North Star Borough School District in the fall of 2008, records indicate a downward trend in parent involvement in parent-teacher conferences. In academic year (AY) '09/'10, while elementary level attendance at the spring cycle of conferences dipped only slightly, participation at the secondary level schools dipped an average of 11.2%. In a memo from the FNSBSD superintendent (March 2010), the decrease in attendance was acknowledged in the same line as the 877 parent contacts made to PowerSchool during the conference week, suggesting parents are remaining involved online as a substitute for face-to-face

meetings. Similarly, personal experience recognizes a dramatic decrease in parent-initiated e-mails and phone calls inquiring about a student's grade and/or missing assignments since the system's implementation. Has PowerSchool in fact begun replace more direct parent-teacher interactions to the point parents deem personal interaction with teachers and schools unnecessary in monitoring their child's academic progress? Has increased parental monitoring at the secondary level resulted in higher student achievement? Before the district or parents accept PowerSchool as a substitute for meaningful interpersonal communication, the actual impact of parental involvement via PowerSchool in their child's academic progress needs to be evaluated. Ultimately, however, the question is this: How can parents, teachers, students, and schools alike utilize PowerSchool most effectively to promote student achievement?

Framework for the Study

This study originated from the questions asked about the PowerSchool student information management system prior to its district-wide implementation in the Fairbanks North Star Borough School District in the fall of 2008. I have always been intrigued by the influence electronic communication systems have had on the dynamics of interpersonal relationships, power dynamics, and communication styles in different contexts. As a staff member in one of the schools selected to pilot the program I had the opportunity to be a part of PowerSchool's introduction and evolution. With several years of experience, I believe it is time to look back and investigate what effect PowerSchool has had on student success as reflected by grade point average (GPA), and perhaps make suggestions as to how the district, schools, and teachers can enhance the effectiveness of the program to promote student success.

Early in the implementation of the program, personal experience indicated high levels of parent interest in the program as the promise of increased transparency to their child's education would allow them unprecedented insight into details rarely communicated to parents, thus increasing their potential to have an increased affect on their child's academic performance. In particular, I and other staff members anticipated

that parents who were less likely to contact schools directly about their children's issues would be able to do so at their leisure and anonymously – interpersonal interactions were not necessary, and the opportunity for the many issues that sometimes accompany parent-teacher interactions could be avoided almost entirely. The hope at the time was that PowerSchool could be used to help build bridges between schools and parents without direct teacher/staff intervention. On the broader scale, there was the anticipation that PowerSchool would be used by all to help students in all areas of their education, not just academics.

Student receptiveness - as expected – was less than enthusiastic. As time proved, the veil of ambiguity associated with the role of "student as communicator" between school and home life was lifted. PowerSchool shifted the balance of power towards parents, who now have the ability to check-up on their children without the child's intercession or even knowledge. Interestingly, what has evolved in conjunction with this real-time parental access to student information has been an increase in student interest in their own grades and sense of empowerment. Rather than being asked "What's my grade in this class?" as I was asked uncounted times prior to PowerSchools implementation, now student interactions are more along the lines of "I need X assignment to bring my grade up". How refreshing! Students are now more able to monitor their own academic achievement and have an effect on it if they so wish.

The fundamental question of how these factors actually interact and their ultimate impact on student achievement was the basis for this study. Several observations indicate that PowerSchool is already altering the education community and parent-teacher relations. Declining attendance at parent-teacher conferences in recent years has been noted and attributed to online involvement as a possible substitute to face-to-face meetings. Also, a significant drop in parent-generated e-mails concerning student performance could potentially also be associated with the trend. Has more regular parental contact with school via PowerSchool reduced the need for interpersonal contact and attendance at conferences? And are students themselves employing self-monitoring strategies to enhance their own learning experience? The overlying question, however,

is: how can parents, teachers, students, and schools alike best employ PowerSchool to maximize student achievement?

Defining the Terms

In determining the scope of the study, several fundamental concepts needed to be defined to focus efforts and establish measures of comparison. First, while it is generally accepted that aspects of a child's education such as promotion, social adjustment, and enrollment in advanced classes are indicators of a student's success (Henderson and Mapp, 2002), this work limits the measure of student success and achievement to GPA attained during an academic year. Parental involvement is typified by a wide range of behaviors, including tutoring, PTA membership, classroom support, and extra-curricular activity support (Catsambis, 1998). This study emphasizes the number of parent and student contacts with PowerSchool during an academic year and presumed follow-up actions to enhance grades. Finally, student information systems are online resources used to access information about numerous aspects of a student's academic record, including demographic information, attendance, assignments, and grades. According to Bober (2001), "…a SIS is a data-driven system that provides easy access to timely information that has relevance and purpose, with the intention of empowering its users" (p. 3). For this work, PowerSchool, designed and supported by Pearson, was the online system utilized by the Fairbanks North Star Borough School District, and is by default the program associated with this investigation.

Designing the Study

To address some of these concerns, this study was designed to investigate the potential relationship(s) between the frequency of use of an online student information management system by parents and students and the student's grade point average. Parental involvement in a student's education is highly correlated with increased student achievement in school – namely grades (Thompson, 2008). Direct parental involvement in the details of their child's academic progress typically declines as a student progresses

through middle school and high school due to the increased number of classes, teachers, and more advanced material (Strom and Strom, 2003). However, the introduction of SISs in recent years has offered real-time on-demand access about numerous aspects of a student's school life to parents and students alike. Are families utilizing this new venue to become more involved in tracking student's grades, assignments, attendance, and assignment completion, and does this involvement translate to higher achievement as reflected in their students GPA? Also, is there a difference in its utilization between middle school and high school age students and families?

To study these questions, two populations of students from the Fairbanks North Star Borough School District (FNSBSD) were selected and data was studied spanning a two-year period – middle school students as 7th and 8th graders, and high school students as 10th and 11th graders. Fairbanks, a middle-sized widespread community located in the interior of Alaska, is comprised of a diverse combination of populations: an academic community associated with the University of Alaska campus, a military population stationed at two medium-sized military bases within it's boundaries, a core blue-collar population supporting construction, mining, oilfields, and other industrial interests, and an urban population more often associated with blighted inner-cities than Alaska. The region also enjoys the advantages of a community with a highly developed information infrastructure, enabling individuals in relatively rural settings to remain in contact if they wish to be. In essence, Fairbanks represents a diverse set of cultures, populations and lifestyles not often found within the boundaries of one school district. It is hoped others can utilize the results from this study in different communities to guide policy and enhance efforts to promote student achievement

Limitations to the Study

The limitations to this study are varied. For one, the breakdown of student PowerSchool contacts compared to parental contacts could not be determined. As suggested in personal contacts with FNSBSD personnel (April 2010), a significant number of parents log in to the system under their child's identification number and

password. An informal show-of-hands in my own classes indicated that approximately one quarter to one third of my students' parents contact the system using the student profile. Therefore, values used in this study are records of total contacts – no differentiation was made between logins under a student or parent account. Therefore, the impact of PowerSchool's utilization on a child's achievement as it differs between parent and student contact rates remains unexplored.

Also, the effect of regular access to computers and the Internet could not be reliably determined from student records alone, and was therefore not included. Regular Internet access and an active e-mail account are instrumental to being able to take best advantage of online resources such as PowerSchool. While students enrolled in school have regular access to online portals, parental access can be highly correlated with a number of factors including culture, economic resources and type of employment (blue/white collar) (Adkins et al., 2004). Accordingly, the impact of these variables on parental involvement via the SIS could not be considered in this study.

A third limitation to the study was the limited definition of academic success. The inability to include courses taken by the students in the study narrowed the definition of success to GPA. Likewise, advances in an individual student's academic progress could not be assessed, such as enrollment in Honors classes or placement in lower-level courses. Thus, any differentiation between GPA success and success compared to any other measures was not possible.

In addition to the above, the actual purpose of PowerSchool contact was not included in the study. The system has the ability to provide a wide array of information about a student's academic life, including charges made to their food account and monetary balance, attendance record, discipline record, as well as academic information such as grades and assignments. While personal interactions with parents and students alike indicate the vast majority of PowerSchool contacts are grade and assignment oriented, there is no assurance that every contact was academic in nature (i.e.; the cases involving students with high truancy rates and parents checking to see if their child made it to school or class).

Finally, no demographic information was included with the records. It would have been illuminating to explore potential connections between PowerSchool utilization and gender, race, cultural background, socio-economic background, and a myriad of other characteristics. However, such a study would have potentially been greater than the regular scope of a thesis, and will therefore have to wait for later investigation.

LITERATURE REVIEW

The Novelty of the Topic

In our present-day culture of rapid technological advances and an increasingly online society, it is no surprise that the educational world has incorporated new technologies, effectively transforming the day-to-day functioning of schools in ways almost unimagined even two decades ago. In particular, the debut of Internet and computer mediated communication transformed the parent-teacher relationship almost overnight. The introduction of student information systems (SISs) to the educational setting has also changed aspects of the education culture in ways we are only beginning to understand and appreciate. The novelty of these advances has not allowed much time for data to be collected; therefore little qualitative research evaluating its effectiveness has been published (Thompson, 2008). In spite of school districts implementing various versions of SIS programs, there is a dearth of empirical evidence linking these systems to increased parental involvement and improved student performance (Ngoma, 2009). Most research to date has analyzed computer-mediated communication and its effect on the quantity, tone, and frequency of parent-teacher e-mails (Thompson, 2008; Strom and Strom, 2003). Similarly, other studies point to the past successes in technological advances in improving parent awareness of school events, class assignments and other unidirectional, impersonal and relatively unchanging information (Adkins et al., 2004). These works and others point to the anticipated positive impacts of SISs, as these programs are poised to help resolve many communication issues identified in studies analyzing barriers to parent involvement and student motivation and empowerment. This literature review will analyze factors both encouraging and discouraging parent and student involvement and academic achievement, and suggest how certain aspects of SISs could promote the positive factors leading to enhanced student success.

What Defines Student Achievement

In an extensive review of literature and studies examining factors promoting student success, Henderson and Mapp (2002) concluded that student achievement, rather than having one concrete definition, was instead measured by the following outcomes: school adjustment, reading and language skills, social skills, grades and GPA, attendance, enrollment in advanced courses, and promotion to the next grade. For the purposes of this study, the primary measure of student achievement will be GPA.

Parental Involvement and its Impact on Student Academic Achievement

Research strongly supports the hypothesis that parents' support and involvement in school and their child's education are strongly correlated to student academic success. Students with involved parents are more likely to have higher scores on standardized tests, enroll in more challenging academic classes and programs, have better attendance, have fewer behavior issues, are more socially adept, exhibit a more positive sense of well-being, and have more positive attitudes towards their own education (Shrivani, 2007; Zappe, Sonak, Hunter and Suen, 2002; Henderson and Mapp, 2002; Thompson, 2008; Ngoma, 2009). The influence of parents is almost undeniable; across economic, social, and cultural backgrounds, student achievement improves with parents' involvement in almost any aspect of their child's education, be it through social development, academic achievement, and/or behavioral issues (Henderson and Mapp, 2002; Bober, 2001; Adkins et al., 2004). A number of researchers have also suggested that teachers regard parental support and interest in their child's academics as the factor most critical to student success (Strom and Strom, 2003; Adkins et al., 2004). In a comprehensive review of over 51 studies published between 1995 and 2005, Henderson and Mapp (2002) came to the conclusion that: "Taken as a whole…studies (have) found a positive and convincing relationship between family involvement and benefits for students, including improved academic achievement. This relationship holds across

families of all economic, racial/ethnic, and educational backgrounds for students of all ages" (p.23).

Students themselves often are direct reflections of their parents' attention, oversight, and eventually, academic expectations. The correlation between student achievement and parental involvement is positively implied in a number of studies seeking to account for differing levels of student engagement and success with differing levels of parental support (Zappe et al., 2002; Hampton, Anderson, and Sigman, 2002; Adkins et al., 2004). While most students seem to benefit from greater levels of parental involvement, students who develop more reflective learning styles – learning for the sake of mastery of the subject – are more likely to benefit from close monitoring of grades than students for whom grades are the primary objective of the educational process (Zappe et al., 2002; Hampton et al., 2002; Fan and Williams, 2010; Kohn, 2004). Mere parental oversight of grades and assignments is not enough to promote student success. While the emphasis of parental support needs to shift from social/emotional development in the elementary years to a more academic focus in adolescence and beyond, omission of support in any aspect of a students developmental needs at any age impedes optimal achievement (Fan and Williams, 2010).

Definition of Parental Involvement

Epstein and Sanders (2000) using the work of Catsambis (1998) developed a framework defining the six types of parental involvement seen at all stages of development: parenting, communicating, supporting school, learning at home, decision making, and collaborating with the community. In accordance with the developmental needs of children, appropriate parental supports with regards to education and academic support change as children mature: appropriate expressions of "parental involvement" differ greatly between elementary, middle, and high school levels (Henderson and Mapp, 2002; Thompson, 2008). Students in the elementary grades benefit more from parental involvement in the classroom and activities directly supporting school activities while older students appear to benefit more from less-direct modes of involvement in

accordance with their stage of development. These differences, and their underlying motives, are explained further.

In the elementary years, along with mastery of basic reading, math, and comprehension skills, social and emotional development are the focus and measure of academic success (Adkins et al., 2004; Henderson and Mapp, 2002). Parental involvement typical of the primary school levels support these objectives – direct classroom support (tutoring, teacher support, field-trip chaperoning), PTA involvement, and re-enforcement of basic skills (especially reading and math) at home (Adkins et al., 2004). Accordingly, in the elementary years, most parent contact with the school focuses on issues promoting the emotional and social development of the student, frequently taking place in face-to-face meetings and the development of a meaningful relationship between the student, parent, and teacher and other support staff (Adkins et al., 2004; Thompson, 2008). As students mature from the early to late elementary school years the nature of communications and interactions shifts from social and developmental concerns initiated equally by parents and teachers to communications concerning academic performance (i.e. - grades) initiated primarily by parents (Thompson, 2008).

At the middle school level, the challenges parents encounter in communicating and establishing meaningful relationships with multiple teachers across a variety of subjects and learning environments begins to become apparent (Strom and Strom, 2003). It is at this point when the focus of parental involvement appears to shift significantly (Thompson, 2008). Instead of focusing on their child's social and emotional needs, parents increasingly focus on the outcome of their child's academic efforts, specifically grades and homework (Bober, 2001; Henderson and Mapp, 2002; Hampton et al.: 2002; Strom and Strom, 2003). Likewise, the nature of parent-initiated electronic communications with teachers shifts from social-emotional development to more objective topics – homework assigned, assignments submitted, attendance – while inquiries involving negative information requiring specific correction (behavior) still require the intimacy of face-to-face communication (Thompson, 2008). Accordingly, parents' support of the school in the larger scale also alters significantly. Parental

involvement shifts from direct classroom integration to larger school-wide initiatives – PTA membership, parent-to-parent communications, and support of extra-curricular and after school activities.

At the high school level, there is the potential for parents' involvement in certain aspects of their child's education to inhibit the intrinsic motivation and desire in their child to be academically successful (Fan and Williams, 2010; Strom and Strom, 2003). An offspring's desire to separate from the parent and become their own person with a separate identity and agenda is most intensely displayed in the late-adolescent years. Appropriate parental involvement suggested for this stage of adolescent development promotes the child's growing autonomy; reduced monitoring of grades and homework, decreased involvement in school activities, and an associated increase in discussions concerning college and career plans. (Henderson and Mapp, 2002). The majority of research indicates that a more relaxed, less-involved level of parental oversight may promote student achievement, lead to an enhanced self-concept, and pave the road to continuing education past the high school level. Parents who express confidence in their child and their desire for the child's continuation on to college are more frequently associated with children reporting higher levels of academic achievement, self-satisfaction, and self-image (Henderson and Mapp, 2002; Fan and Williams, 2010; Hampton et al., 2002). Conversely, it is not uncommon for children whose parents are inappropriately and/or overly-involved in their school and educational process to perceive the involvement as a trespass. Frequently, the child's response is rebellion and rejection of parental expectations and school as a whole, often leading to academic sabotage and failure (Fan and Williams, 2010; Henderson and Mapp, 2002).

Factors Promoting Parental Involvement

With parental involvement recognized as a major factor contributing to overall student success – academic, personal, and social – the issues to be addressed turn to the differences between parents. Why do certain schools and communities enjoy higher levels of involvement, and what – if anything – can schools do to encourage involvement

and presumably promote student achievement? The answers are not simple, nor is there only one single factor. Trends, however, are suggested.

Across regional, economic, and cultural differences in America, several key pieces of their student's academic life are strongly associated with helping parents to be effectively involved in their student's academic success. In an extensive study performed by Adkins (et al.) on behalf of the state of Illinois, published in 2004, four key elements were suggested as being critical in parental engagement. The first is knowledge about homework and assignments: when they are given, when they are due, and performance expectations. The second is timely feedback on matters concerning student progress: evaluation of student work, effort delivered, as well as areas of performance that require improvement. The third factor is ways that parents can help their child improve at home without direct teacher intervention. The fourth and final key to effective parental involvement is student attendance. Regular school attendance is critical in establishing and maintaining a strong academic performance as well as remedying low academic achievement and gaps in student learning.

Parents' personal experience is strongly implicated as a significant factor in the level of support and encouragement parents demonstrate, both positively and negatively. Parents who themselves have achieved higher levels of education (in particular, advanced degrees) are much more likely to express high educational expectations for their own children (Henderson and Mapp, 2002). These parents have experienced a higher degree of success in their educational pursuits and have benefited from the system, and therefore are more likely to encouraging their own children to strive for similar achievements. Accordingly, parental involvement in age-appropriate manners is generally high, and high levels of student self-esteem and goals for the future are the result (Adkins et al., 2004, Fan and Williams, 2010).

Sadly, the opposite is also true. Chase (as cited in Meier, 2000) argues that our country's legacy of racism, discrimination, and socio-economic disparity is reflected in our educational system. In a system where parental support and involvement is so crucial to student success, it is difficult for parents who themselves were ill served in their own

experiences as students to turn around and encourage their own children to buy into the educational culture (Adkins et al., 2004). Accordingly, parents from marginalized ethnic and economic minorities are far less likely to be positively involved in their child's education and support school activities, especially when so many factors leading to their alienation are still prevalent in our educational system (Sizer, 2000; Kozol, 2005). Not surprisingly, while some schools in these marginalized communities may enjoy strong parental involvement in school activities and social events as an expression of a shared culture, the degree to which students are encouraged to do well in school and progress on to college is far lower than in mainstream America (Adkins et al., 2004).

Many studies implicate another significant factor contributing to parental involvement in the computer age; economic affluence. Mere access to computers has been associated with more effective parental oversight of their child's education. Aside from being able to afford technology for their families at home, parents in more affluent (white collar) employment often have regular access to a computer and the Internet as a benefit of their job. This provides a means by which they can visit their child's school website, communicate with teachers via e-mail, and access the SIS to monitor student grades, attendance, and other aspects of student academic life at their convenience. Conversely, parents employed in blue-collar positions are less likely to have regular access to computers and online resources to help them remain engaged in their child's academic life (Thompson, 2008; Adkins et al., 2004). While the emergence of lower-cost connectivity and normalization of computer mediated communication (e-mail, twitter, blogs, personal sites, wireless connectivity, etc.) have made real-time uni-directional communication more convenient for many parents than face-to-face meetings, the less affluent in any society will frequently have less access to these methods of communication and stand to benefit less (Hampton et al., 2002; Strom and Strom, 2003). Accordingly, children of less affluent families more likely to receive lower levels of parental support in the areas of academic support, school activities, and other factors strongly associated with higher levels of student achievement (Strom and Strom, 2003).

The common thread implicated in the strong or weak level of parental involvement appears to be the degree to which parents feel they can have an effect – whether or not they feel their efforts will meet with success (Henderson and Mapp, 2002). Research conducted by Bober (2001) studying the early impact of centralized online student information programs suggests that, as users become more accustomed to using SISs, the more they become involved in student and school related issues. When parents are aware of assignments, attendance, and behavioral issues, there is a notable improvement in student work completion, grades, attendance and behavior in general. This involvement also results in improved parent self-concept in their ability to help their student as well as student confidence and self-efficacy (Shrivani, 2007). Therefore, many online student management systems are designed to provide precisely the real-time information parents need to be involved in their child's education: attendance, assignments, grades, and school activities (Bird, 2006; Adkins et al., 2004). Interestingly enough, work conducted by Henderson and Mapp (2002) indicates the parents' confidence is ingrained in their children, as students of empowered parents report higher levels of self-confidence in their ability to perform well in school.

Studies suggest that a parent's sense of efficacy is also reflected in the degree to which they actively seek to become involved in school and their child's progress. Generally, parental involvement can be characterized as passive or active – whether they seek-out information and involvement or wait for the school to contact them. The school itself largely influences this aspect of parental involvement; an institution that emphasizes and encourages parents to become involved typically enjoys fewer discipline issues, higher attendance, and enhanced student learning and achievement. With a stronger sense of self-efficacy, these parents in turn are more likely to be more proactive in obtaining information about their child and ways they can support their child's academic progress at home. Conversely, parents who feel disenfranchised from the school are more likely to take a more passive or even apathetic stance in becoming active participants in their child's education (Adkins et al., 2004; Henderson and Mapp, 2002).

Factors Encouraging Student Motivation and Achievement

As most parents can admit, raising a successful child is a constant battle of wills – children simultaneously struggle to find their own voices and independence yet at the same time seek guidance and support. While much of the focus on student academic achievement in this work has focused on parental involvement and parental influence in general, certainly it would be negligent of any researcher to ignore that students themselves have a significant – and perhaps the ultimate – impact on their own success. A corollary inquiry has to be made: what structures and conventions has our educational system set in place to help our students help themselves to higher academic achievement, and how are these being utilized by students?

Few would disagree with the personal observation that the students of the first decade of the new century are more comfortable with the various modes of electronic communication than the average adult. In addition, they have more regular access to the Internet than the adult through school, library, and personal devices (Bird, 2006). They have more regular access to academic resources, school and teacher websites, their own school records, and a plethora of resources to enhance their academic performance (Bird, 2006; Hampton et al., 2002; Zappe et al., 2002). Computer–mediated communication, access to online-resources, the ability to instantly access supplemental information, and the ability to utilize technology as a whole has a positive impact on student's self-confidence, self-sufficiency, and self-efficacy (Zappe et al., 2002; Hampton et al., 2002). While the utilization of resources specifically designed to promote student achievement is not considered in this work, the results of a group of studies have yielded some insights.

A study conducted by Hampton, Anderson, and Sigman (2002) investigated the utilization of an early version of PowerSchool by a population of 6th grade students and their parents and the resulting GPAs of the students. As the parents and students became familiar with the online system to monitor student progress, two phenomena were observed. First, more frequent monitoring of grades appeared to have a more direct and positive impact with lower-performing students (i.e.: more monitoring promotes an improvement in grades with students who are struggling). Two: more frequent

monitoring of average and high-performing students had a slightly negative effect on student GPAs. While the study was not conclusive, it strongly suggests the potential for online student information systems to empower less engaged parents in remedying low student achievement.

In another study conducted in 2002, Zappe, Honak, Hunter and Suen focused on the effect of information feedback using an online system and its effect on motivation and academic performance in middle school students. Several trends in student motivation with regards to achievement are suggested in this work, including:

- Self-reported motivation is closely related to the opportunity to change (improve) a grade a student has received. Grades in and of themselves can be de-motivating and reduce a student's sense of self-efficacy. When a student has a chance to modify their learning for a better grade, subject mastery instead of performance mastery becomes the goal. This shift in focus resulted in students reporting more positive attitudes towards learning, a preference for more challenging work and increased willingness to take risks in learning, and higher levels of pride and satisfaction in their work.
- Students who spent more time online with each SIS contact performed better academically. (These students presumably spent more time reflecting on their own performance and devising ways to improving it.)
- Students who reported higher levels of academic confidence spent more time with each SIS constant.
- Students who benefited the most from SIS contact reported higher levels of intrinsic motivation to succeed in school. The desire appeared to be ingrained by the time a student left middle school. Parents' efforts to instill the desire to succeed in any aspect of life after a child had transitioned to the high school level were significantly less successfully.

How SISs Stand to Promote Academic Achievement

Prior to the introduction of electronic communications, students and parents relied on personal communications with instructors to monitor and evaluate a child's academic progress and other issues associated with social and emotional development. Often times, just as today, these communications were influenced by a myriad of non-verbal factors including social standing, cultural background, and economic affluence (Adkins et al., 2004; Strom and Strom, 2003; *THE Journal*, 2000; Hampton et al., 2002). Also, the timeliness of feedback inhibited parents from taking an active role in their children's education. Unless parents took a proactive stance in following their child's academic progress and school issues, more often than not they learned of issues too late to take appropriate and effective action, and oftentimes felt disempowered when they did (Thompson, 2008; Bober, 2001; Strom and Strom; 2003). The entanglements of interpersonal relationships also often inhibited the efficient and unbiased flow of information, further contributing to inefficient and sometimes even ineffective effort to promote student interests (Thompson, 2008; Bober, 2001).

Prior to the introduction of SISs and the widespread use of school websites, the majority of parent-initiated communications at the secondary level sought information concerning grades, homework, due dates, and attendance. Since the advent of the Internet, the time teachers spend responding to these communications has dropped dramatically (Thompson, 2008). The introduction, widespread acceptance and utilization of computer-mediated communication (specifically the Internet, with associated website access and e-mail capability) has provided a forum which appears to have helped in alleviating many of the previously perceived social and cultural drawbacks to individual communications mentioned earlier (Bober, 2001; Adkins et al., 2004). In particular, the introduction of online resources (SISs, e-mail, the internet and websites) has enabled parents and students alike access to timely information, including unbiased feedback on assignment completion and grades, attendance, and school events - the factors most

closely associated with parental involvement and, ultimately, student achievement (Bober, 2001; Hampton et al., 2002; Henderson and Mapp, 2002).

Ironically, while one of the downsides to electronic communications is the lack of personal interaction, for some it is actually a benefit. Traditionally, parental involvement in a student's progress in school and other associated issues required at least some minimal formation of relationships with teachers and other school personnel (Thompson, 2008). As with any interpersonal interactions, some relationships are more congenial than others, with factors such as communication styles, race, cultural background, socio-economic status, and other aspects of our existence influencing the communication, however indirectly. For individuals and members from cultural backgrounds less likely to engage educational institutions and become involved with their child's education directly, SISs and websites present an opportunity to become involved anonymously and invisibly to the school. These and other forms of electronic communication provide a forum for parental involvement while avoiding anticipated discrimination or bias, not to mention the effort of forming personal relationships entirely (Thompson, 2008; Adkins et al., 2004; Hampton et al., 2002; Bober, 2001).

Conclusion

It is apparent that student achievement is affected by many variables: parent involvement, culture, socio-economic status and other factors too numerous to mention here. The interplay of factors promoting and impeding academic success may never be fully understood, especially with a seemingly never-ending parade of new demands on the educational system, introduction of new technologies, and a culture changing seemingly at the speed of a teen's thumbs as they text message. While it is generally thought that improvements in communication would be one less barrier to student achievement, it remains to be seen whether or not students and parents are able to embrace these new venues and use them to their advantage. If not, then it would appear we have added one more distraction to our already hectic lives for minimal benefit.

METHODS

Overview

As was recognized early in the study and confirmed as research progressed for the "Literature Review", student achievement and the underlying causes promoting or inhibiting students in their academic pursuits are varied. Some students are empowered by the ability to monitor and affect their academic performance and do so effectively. Others, in spite of their best desires and efforts, may be hampered by factors over which they have little or no control, and monitoring their progress via PowerSchool has minimal impact. Considering these two potentially nullifying factors, there was the possibility for this study to reveal null results: low-achieving student records with frequent PowerSchool contact but limited resources or ability to affect their own achievement could theoretically counter high-achieving individuals with a similar number of PowerSchool contacts but more resources to affect the situation (personal contact with FNSBSD Office of Research Integrity personnel, April 2010).

For this study, the first order of business was to explore the potential connection between student GPA and the number of PowerSchool contacts recorded in each academic year. Using the Statistical Package for the Social Sciences (SPSS) software program, two scatter plots were generated to explore potential overshadowing trends prior to more detailed study. A positive connection indicated by identifiable groupings on "Contacts versus GPA" visuals could potentially have indicated some degree of relationship. Such visuals also could have indicated special subgroups or trends warranting closer scrutiny. Data points spread evenly around a visual representation without any discernable trends or groupings could have indicated little to no connection between parent/student PowerSchool contact and GPA.

Following the establishment of trends in observable data, numeric and graphic means were employed to explore other possible connections between PowerSchool contacts and GPA. Several comparisons were developed to potentially detect subtle nuances in the relationship between the targeted factors. In general, student data records

were grouped by a measure of criteria, an average value for a dependent variable was calculated, and the independent and dependent variables expressed on a lateral bar chart. Specifically, the potential relationship between a student's GPA and the average PowerSchool contacts was investigated, while a second series of observations examined trends in students' GPAs compared the number of family PowerSchool contacts in the academic year.

The third and final stage of this study was to explore connections between PowerSchool contacts and GPA that could only realistically be revealed using established statistics software programs. With a potential increase in GPA with increased PowerSchool already explored, would there be a similar decrease in GPA with PowerSchool contact reduction? For this inquiry, SPSS was again employed, with resulting correlation charts depicting potentially related observations with respect to the dependent and independent variables.

Selection of Participants and Acquisition of Student Records

As mentioned in the "Literature Review", as their children mature, the emphasis of education shifts from of emotional and social development in the elementary years to academic performance and achievement in the secondary years. With the cooperation of the FNSBSD Office of Research and Integrity, data from two targeted populations of students were delivered in July 2010. The first study group was comprised of students completing their 8th grade year. The students of this group had completed the first two years of secondary education (middle school), when the focus of appropriate parental involvement transitions from emotional to academic support. The second study group was comprised of older public high school students having completed their 11th grade year. These students presumably were out of the crucible of their freshman year and were not yet into the college-crunch senior year (where for some every grade counts).

Student records were screened for completeness. Data from both study groups was limited to students who spent the '08/'09 and '09/'10 academic years in the FNSBSD where students and parents had access to the district's PowerSchool program. Records

missing information in a variety of fields were removed from the study group. In particular, records missing GPA values for either academic year and records indicating that the student did not participate in standards-based assessments (indicating they were not enrolled for the entire year or were enrolled in an intensive resource program) were deleted from the study group. Records where there were no values for PowerSchool contacts were filled-in with a "0" value, reflecting no recorded contact that year (personal communication with FNSBSD personnel, September 28, 2010). In addition, two high school level records were excluded from the study in consideration of their unusually high number of PowerSchool contacts – more than five times the average for both years of the study – which influenced the average values of their study groups by as much as 11%. Also, records indicating a repeated or skipped grade level remained in the sample sets. From an initial pool of 2164 total student records, 818 middle school records and 820 high school student records remained for analysis.

For many of the following treatments of the data, records were divided into four sub-groups - 7th graders during academic year (AY) 2008/'09; 8th grade, AY '09/'10; 10th grade, AY '08/'09; and 11th grade, AY '09/'10.

Data Analysis: General Trends

To detect and scrutinize any potential trends and/or anomalies in the data that may not have been discovered using only numeric analysis, a series of bivariate scatter plots were computed. Using SPSS, figures comparing PowerSchool contacts and GPA were computed for each of the academic years under scrutiny. The plots were analyzed for any trend that could have skewed results in other measures in which values were averaged, including sub-populations that could have influenced results potentially stemming from institutionalized structures (such as After School Program grade checks).

Establishing A Connection Between GPA Achievement and SIS Contacts

Visual representation of potential relationships between the variables only permits a subjective and general description of potential relationships. To detect potentially significant trends not readily apparent using other means, Pearson's correlation

coefficient equation (Figure 1) was employed using SPSS software to compare the PowerSchool contacts and GPA data sets to calculate numeric values indicating relationships between the variables:

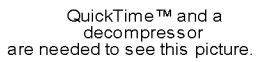

Figure 1 - Pearson's Product Motion Coefficient

In the above equation, x and y represent the values under scrutiny (GPA and SIS contacts), n represents the number of records included in the particular investigation, and the resulting *r-value* indicates the degree to which the two variables are correlated. With a maximum value of 1.0 indicating perfect correlation, values 0.5 and above are typically considered significant, reflecting a potential relationship between the two variables (Ferguson, 1981).

Developing Value-Based Trend Lines

Two comparisons were designed to better observe the details in PowerSchool contact and GPA trends. To make these observations and associated calculations, the Microsoft (2004, Version 11.3.5) Excel and Word programs were employed. In each case, student records from the different grade levels were grouped based on value ranges. Averages of the criteria under scrutiny were calculated utilizing functions available in the Excel program. In addition, the number of records meeting the criteria of that particular category was recorded, and the percentage of the population meeting the criteria was also calculated. The tables and figures depicting these results included in this report were constructed using the Microsoft Word program applications. Finally, applications in the Microsoft Word "Chart" program were utilized to display the results.

Trends in SIS Utilization vs. GPA Achievement

The investigation into PowerSchool utilization for optimal results led to the development of a second series of tables and figures. Records were sorted by the number of contacts, divided into equal groups representing records that made contact approximately the same number of times during the years, and average GPAs calculated for the groupings. The two exceptions to this procedure were 1) the records that had "0" recorded contacts – these records were treated as a separate group, and 2) the group of elite records that had made contacts at such unusually high and diffuse numbers that groupings were not possible (this category represented less than 4% of the population). Using the application associated with Microsoft Word software, trend lines were applied. Using these visuals, contact rates for optimal GPA achievement could be detected.

RESULTS

Treatment of the Data

For many of the following explorations, records were divided into four sub-groups - 7th graders, AY '08/'09; 8th graders, AY '09/'10; 10th graders, AY '08/ '09; and 11th graders, AY '09/'10.

Establishing General Trends: Middle School and High School

A total of 818 middle school and 822 high school student data records were analyzed for trends utilizing SPSS to construct a series of scatter plots comparing GPA to PowerSchool contacts. A total of four figures were generated (Figures 2-5), two for each of the years in the study for both middle and high school populations:

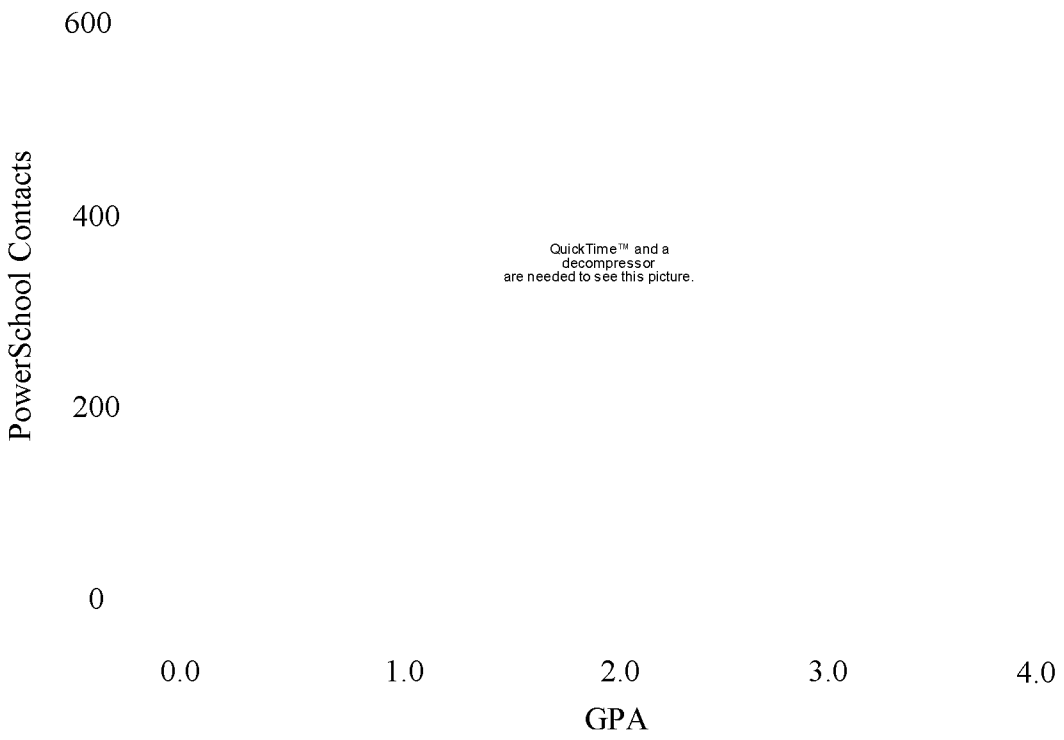

Figure 2 – 7th Grade (AY '08/'09) GPA vs. PowerSchool Contacts

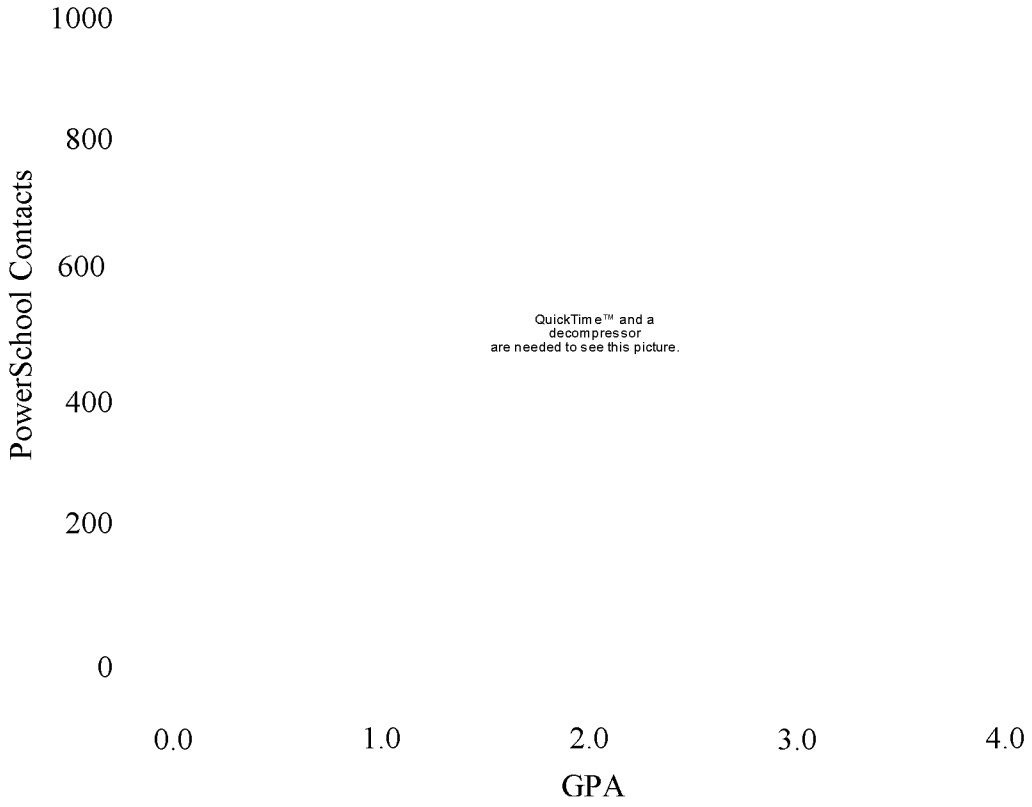

Figure 3 – 8th Grade (AY '09/'10) GPA vs. PowerSchool Contacts

At the middle school level (Figures 2 and 3) the grouping of data points generally falls in the region of 2.5 GPA and higher and 200 PowerSchool logins and less (down to zero). Comparing 7th and 8th grade figures and adjusting for differences in scale, changes in vertical density suggest that the number of contacts increases between 7th and 8th grade. Shifts in distribution along the GPA axis, however, are not apparent. Also not observed in either figure is any indication of a sub-population broken-out from the main group that potentially could have required special consideration or treatment.

Similar scatter plot figures were constructed for the high school populations. Figures 4 and 5 depict GPA and PowerSchool contacts during the study groups '08/'09 (10th grade) and '09/'10 (11th grade) years.

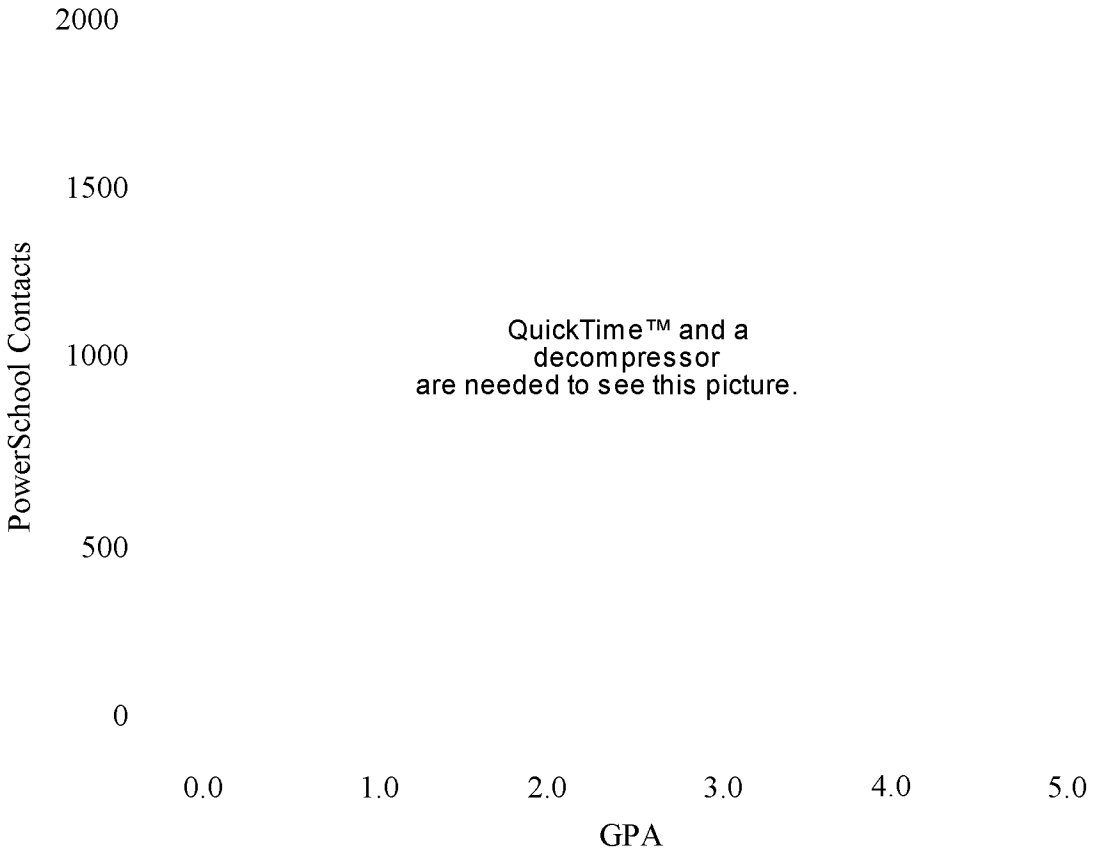

Figure 4 – 10th Grade (AY '08/'09) GPA vs. PowerSchool Contacts

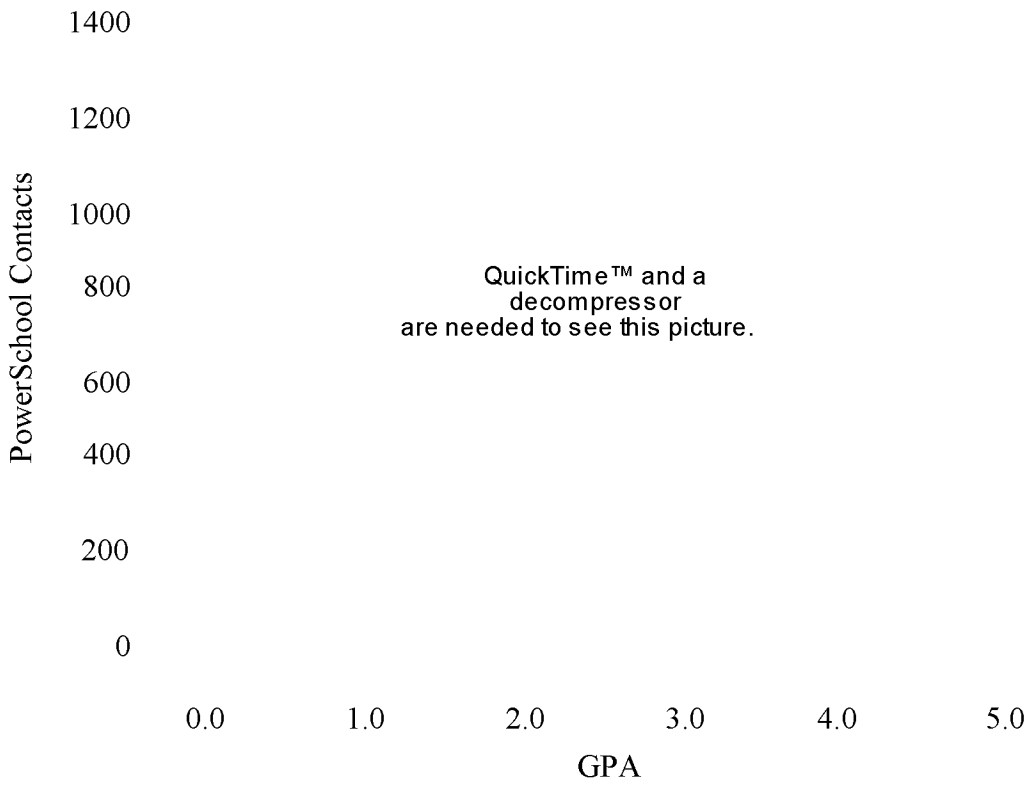

Figure 5 – 11th Grade (AY '09/'10) GPA vs. PowerSchool Contacts

Similar to the middle school data, (Figures 2 and 3), a diffusion of data points is apparent between the '08/'09 and '09/'10 years. In both years, however, a density between GPA values 2.0 and 3.0 is detected, with a vertical density grouping around 100 - 200 contacts. In the 11th grade year, a significant expansion to the right above the 4.0 GPA value can be explained by the addition of advanced placement courses, where a 5.0 can be earned for an "A", and average GPAs can be above 4.0. Interestingly, with a few notable exceptions, the data points in the ">4.0" category do not indicate significantly more PowerSchool contacts than records in lower GPA value ranges. This indicates a potential maximum at which more frequent contacts has minimal impact on grades. However, the rate at which the majority of records are making contact averages about once a day for every day in the academic year, which may be significant.

Correlations Between Variables

The strength of the relationship between two variables (correlation) can be described by a value - a coefficient - representing the strength of association. Using SPSS, Pearson's product motion coefficient equation was used to explore potential correlation between the variables and between years. In all, six comparisons were made for each age group. The results of these comparisons are displayed in Table 1:

Table 1 – SPSS-Computed Pearson Correlations

Variables	Pearson Correlation Middle School	Pearson Correlation High School
SIS Contacts vs. GPA '80/'09	.077	.172
SIS Contacts vs. GPA '09/'10	.061	.263
SIS Contacts '08/'09 vs. GPA '09/'10	.050	.139
SIS Contacts '80/'09 vs. SIS Contacts '09/'10	.677	.699
SIS Contacts '09/'10 vs. GPA '08/'09	.110	.209
GPA '08/'09 vs. GPA '09/'10	.800	.802

In general, high correlations can be seen in both groups in the comparisons between GPA from one year to the next - .800 and .802. Also, the number of SIS contacts between the two years is highly correlated for the middle and high school records - .677 and .699 respectively. These two comparisons indicate a strong tendency for high performing students to continue their achievement while the pattern of SIS contacts also

continues from one year to the next. Weak correlations are indicated in all other comparisons indicating little relationship between the number of SIS contacts and GPA.

An interesting trend is suggested in Table 1 with regards to the difference in potential impact PowerSchool utilization has between the middle and high school populations. In the comparisons that are more weakly correlated, there are potentially significant positive trends as students mature. For instance, while contacts in AY '08/'09 and GPA in AY '09/'10 are weakly correlated in middle school (.050), this rate for the same observation in high school is almost triple (.139), indicating high school students who contact PowerSchool as sophomores are more likely to have improved grades as juniors. Similarly, GPA in AY '08/'09 and contacts in AY '09/'10 are weakly correlated at the middle school level but the rate is almost double for high school students, again indicating a positive trend as students mature (.110 vs. .209). Therefore, while some values calculated in this study may not be significant in themselves, potentially significant trends are suggested.

Another trend in high school students compared to middle school students is that high school families appear more likely to use PowerSchool to monitor and improve their academic performance. Between AY '08/'09 and AY '09/'10, correlation values between contacts and GPA increased by 52% among high school students (.172 vs. .263) while it actually decreased by 21% in middle school students (.077 vs. .061).

Exploring Trends in Achievement Indicated by GPA with SIS Contact

Data was evaluated to further visualize possible connections between academic standing and the number times parents and students had accessed the student's record over the course of an academic year. Records were sorted by GPA score ranges for each of the alphabetic levels; records with a GPA of 0.49 or less were designated the "F" group, 0.5-1.49 as the "D" group, 1.5-2.49 as "C" students, 2.5-3.49 are "B" students, and 3.5-4.0 as "A". In addition, to accommodate high-school-level students enrolled in extra or advanced placement courses offering credits over-and-above the standard 4.0, a sixth category of ">4.0" was included (Academic Grading in North America, 2010).

The four data sets were used to calculate the following values: number of students in that group, percent of the population in that grouping, average GPA of the group (to the second decimal), average number of PowerSchool contacts during the academic year (rounded to the nearest whole number). The results are reported in Tables 2 and 3. Bar graphs comparing GPA standing and PowerSchool contacts are shown in Figures 6 and 7.

Middle School Trends in Achievement Indicated by GPA with SIS Contact

Table 2 and Figure 6 depict trends in PowerSchool contacts and average GPA in the middle school population:

Table 2 – Middle School PowerSchool Contacts by GPA Groups

Average Grades GPA Range	F < 0.49	D 0.5-1.49	C 1.5-2.49	B 2.5-3.49	A 3.5-4.0	>A >4.0
8th Grade ('09/'10)						
Students	1	50	176	339	252	NA
% of Total	0.1%	6.1%	21.5%	41.4%	30.8%	
GPA	0.29	1.08	2.07	2.98	3.82	
SIS Contacts	66	96	129	130	128	
7th Grade ('08/'09)						
Students	3	43	174	336	262	NA
% of Total	0.4%	5.6%	21.7%	41.1%	32.0%	
GPA	0.35	1.20	2.05	3.02	3.80	
SIS Contacts	38	82	96	103	107	

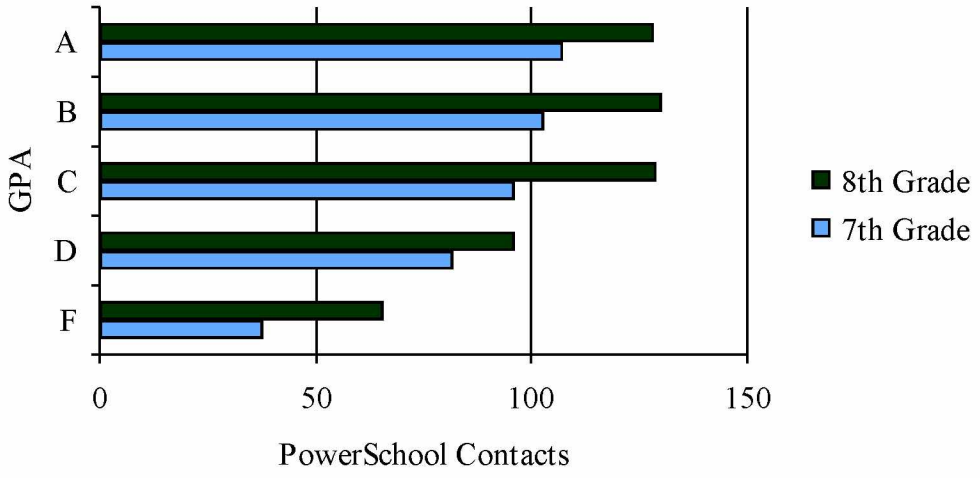

Figure 6 – Middle School PowerSchool Contacts by GPA Groups

Figure 6 illustrates an interesting trend in that PowerSchool contacts increased at every GPA level between the study population's 7th and 8th grade years. What is indicated, however, in Table 2 is that this increased interest in tracking student achievement did not result in an increase in GPA; the percentage of students in each GPA level remained essentially unchanged between the 7th and 8th grade years. This lack of improved student achievement is reflected in the larger picture comparing average contacts to changes in GPA across the population between the two academic years: between AY '08/'09 and AY '09/'10, average PowerSchool contacts increased by 24% while average GPA actually fell by 1.4%.

High School Trends in Achievement Indicated by GPA with SIS Contact

Table 3 and Figure 7 display comparisons between PowerSchool contacts and average GPA in the high school population. A trend similar to the middle school results is reflected in high school population – little change in population distribution among GPA groups, but notable increases in PowerSchool contacts at most levels:

Table 3 – High School PowerSchool Contacts by GPA Groups

Average Grades GPA Range	F < 0.49	D 0.5-1.49	C 1.5-2.49	B 2.5-3.49	A 3.5-4.0	>A >4.0
11th Grade ('09/'10)						
Students	15	79	229	325	107	67
% of Total	1.82%	6.1%	28.0%	39.5%	13.0%	8.2%
GPA	0.17	1.05	2.06	2.95	3.73	4.20
SIS Contacts	44	100	134	174	188	210
10th Grade ('08/'09)						
Students	7	76	271	310	155	3
% of Total	0.9%	9.2%	33.0%	37.7%	18.9%	0.4%
GPA	0.24	1.13	2.03	2.94	3.78	4.14
SIS Contacts	23	92	116	151	145	104

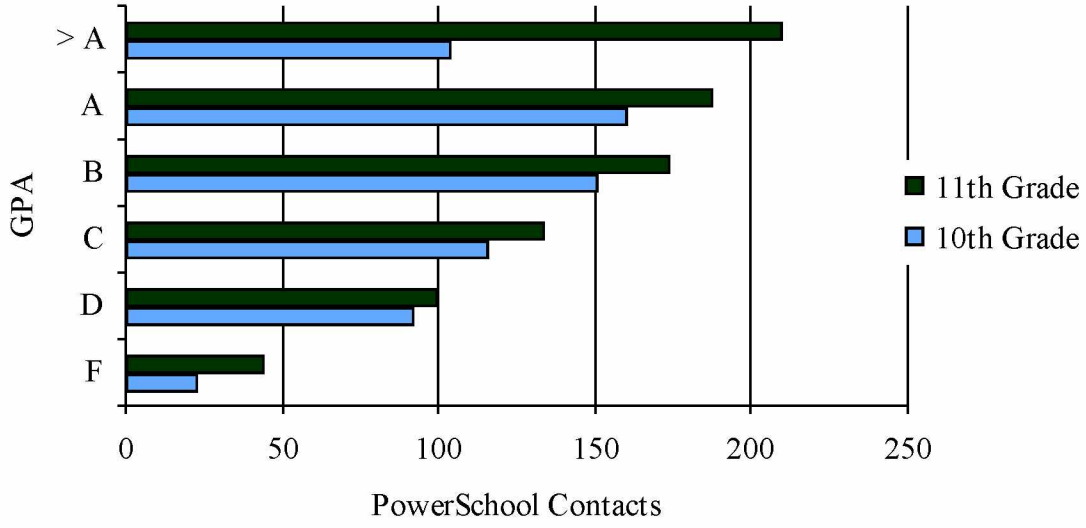

Figure 7 – High School PowerSchool Contacts by GPA Groups

As a population, PowerSchool contacts reported in the high school student records increased 20% between AY '08/'09 and AY '09/'10 while GPAs increased by 2.3%. An apparent anomaly in the 10th grade ">A" group has minimal significance due to the small sampling – three individuals comprising 0.4% of the population. The larger population reestablishes the trend of increased contacts by grade grouping and academic year as 11th graders – 67 individuals comprising 8.2% of the total population.

Optimizing PowerSchool Utilization

Considering the range of PowerSchool contacts among the over 800 student records at both the high school and middle school levels, a series of comparisons were made to tease-out possible trends in the number of PowerSchool contacts and GPA. To optimize observations, four comparisons were made, one for each of the grade levels under scrutiny (two for each study group). Records were first sorted by SIS contacts, then divided into groups based on 30-contact increments. The exceptions to this division were; 1) records with "0" contacts were treated as a separate group, and 2) records with more than 391 contacts for the middle school population and more than 491 contacts for the high school population were grouped together, as cumulatively each group represented less than 4% of their total population and representing their values in the following figures would have added little value.

7th Grade Contact Trends and GPA

Table 4 and Figure 8 depict the 7th grade records (n=818) grouped in increments of 30 contacts, with "0" contacts as a separate group and ">391" contacts as their own group:

Table 4 - 7th grade (AY '08/'09) PowerSchool Contact Trends and GPA

7th Grade PowerSchool Contacts	Student Records	Percent of Population (n=818)	Average Contacts	GPA
0	12	1.4%	0	2.86
1-30	130	15.9%	15	2.85
31-60	169	20.7%	46	2.93
61-90	159	19.4%	75	2.97
91-120	103	12.6%	106	2.98
121-150	72	8.8%	133	3.06
151-180	52	6.4%	167	2.99
181-210	33	4.0%	197	3.10
211-240	29	3.5%	223	2.83
241-270	18	2.2%	256	2.94
271-300	14	1.7%	280	2.84
301-330	8	1.0%	311	3.04
331-360	4	0.5%	345	2.99
361-390	5	0.5%	377	3.04
>391	10	1.2%	509	3.52

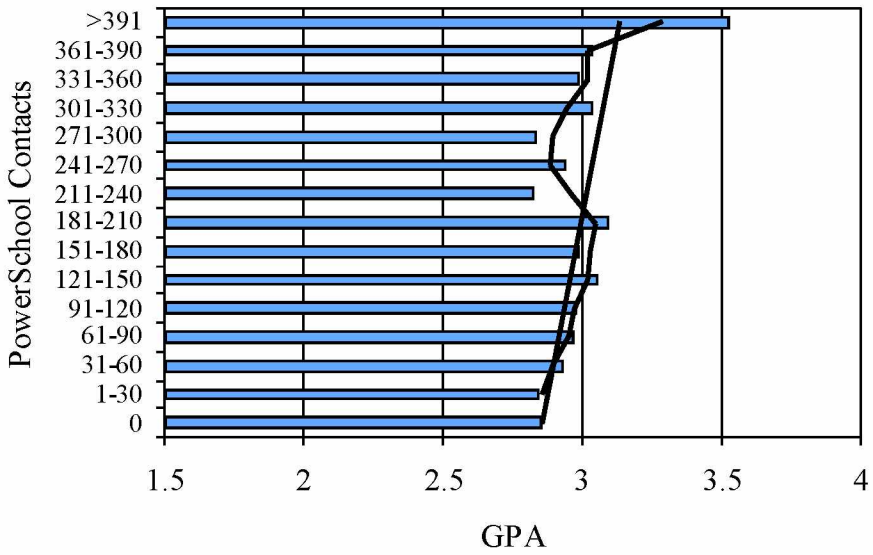

Figure 8 - 7th Grade (AY '08/'09) PowerSchool Contacts Compared to GPA

Overall, a positive trend is detected between SIS contacts and GPA – more contacts are generally associated with higher GPA. The 7th grade results indicate a small peak in the 181-210 contacts range. However, the small number of individuals in this group (33, 4.0% of the population) may not apply across a larger population. With an average number of contacts at 102 and an average GPA of 2.92, the doubling of effort resulted in only a 0.14 increase in GPA between groups. However, for the dedicated individuals in the ">391" category, an average 0.56 increase in GPA was evident.

8th Grade Contact Trends and GPA

Table 5 and Figure 9 depict the records of the 8th grade records (n=818) grouped in increments of 30 contacts, with "0" contacts as a separate group and ">391" contacts as their own group:

Table 5 - 8th Grade (AY '09/'10) PowerSchool Contact Trends and GPA

8th Grade PowerSchool Contacts	Student Records	Percent of Population (n=818)	Average Contacts	GPA
0	5	0.5%	0	3.08
1-30	58	7.1%	14	2.83
31-60	114	13.9%	46	2.88
61-90	149	18.2%	76	2.79
91-120	134	16.4%	104	2.92
121-150	104	12.7%	133	3.03
151-180	86	10.5%	164	3.07
181-210	63	7.7%	192	3.02
211-240	30	3.4%	225	2.79
241-270	22	2.7%	254	2.78
271-300	12	1.5%	284	3.16
301-330	8	1.0%	315	3.16
331-360	7	0.9%	347	3.08
361-390	7	0.9%	369	3.47
>391	19	2.3%	485	2.83

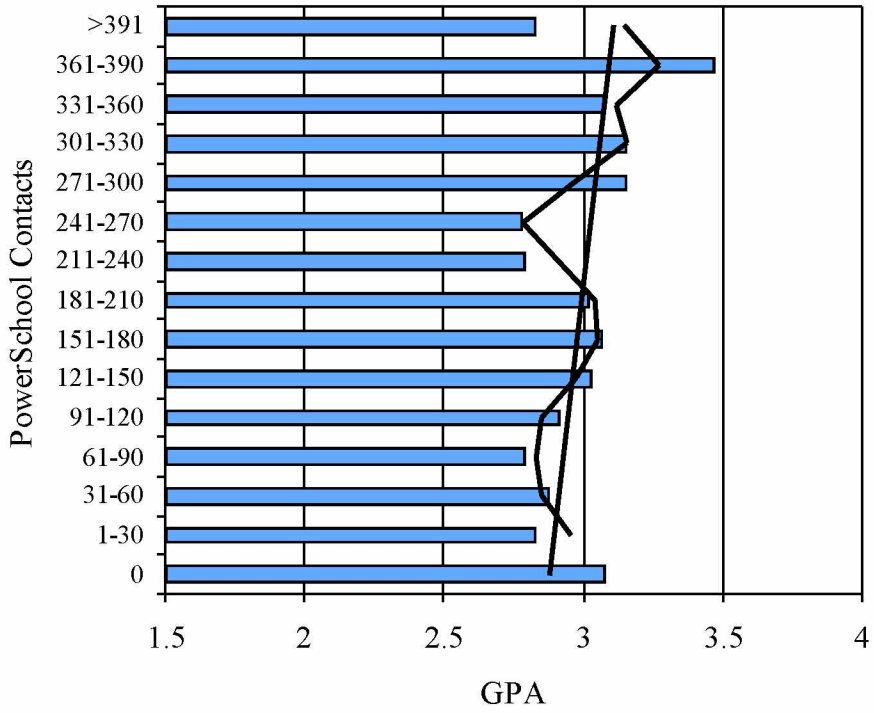

Figure 9 - 8th Grade (AY '09/'10) PowerSchool Contacts Compared to GPA

Similar to 7th grade results, a slight positive association is evident across the contact ranges. The population distribution shifted upward in value from 7th grade; the ranges garnering the three largest numbers of members in 7th grade were 1-90 contacts with 56% of the population, while in 8th grade the bulk of the population fell in the 31-120 range with 48.5% of the population.

In addition, a slight "bump" in GPA values is seen around the 151-180 contacts range, with a noticeable "peak" in GPA in the 361-390 range. However, this second 'peak" is comprised of only seven individuals – less than 1% of the population. It is notable that the ">391" value population almost doubled from 7th to 8th grade (10 to 19), yet the average GPA dropped from 3.52 to 2.83.

10th Grade Contact Trends and GPA

Table 6 and Figure 10 depict the records of the 10th grade records (n=820) grouped in increments of 30 contacts, with "0" contacts as a separate group and ">451" contacts as their own group. For these observations, two student records with extremely high numbers of recorded contacts were not included (in excess of 1000 contacts). These "outliers" inflated their group's averages by up to 11%, and were therefore excluded.

Table 6 - 10th grade (AY '08/'09) PowerSchool Contact Trends and GPA

10th Grade PowerSchool Contacts	Student Records	Percent of Population (n=820)	Average Contacts	GPA
0	19	2.3%	0	2.72
1-30	77	9.4%	18	2.35
31-60	134	16.3%	46	2.36
61-90	136	16.6%	75	2.61
91-120	106	12.9%	106	2.54
121-150	95	11.6%	135	2.79
151-180	71	8.6%	165	2.69
181-210	53	6.5%	195	2.79
211-240	34	4.1%	221	2.71
241-270	20	2.4%	254	2.65
271-300	12	1.5%	285	2.94
301-330	14	1.7%	317	2.74
331-360	15	1.8%	341	2.96
361-390	5	0.6%	376	3.22
391-420	7	0.8%	406	3.05
421-450	5	0.6%	432	2.74
> 451	17	2.0%	675	2.91

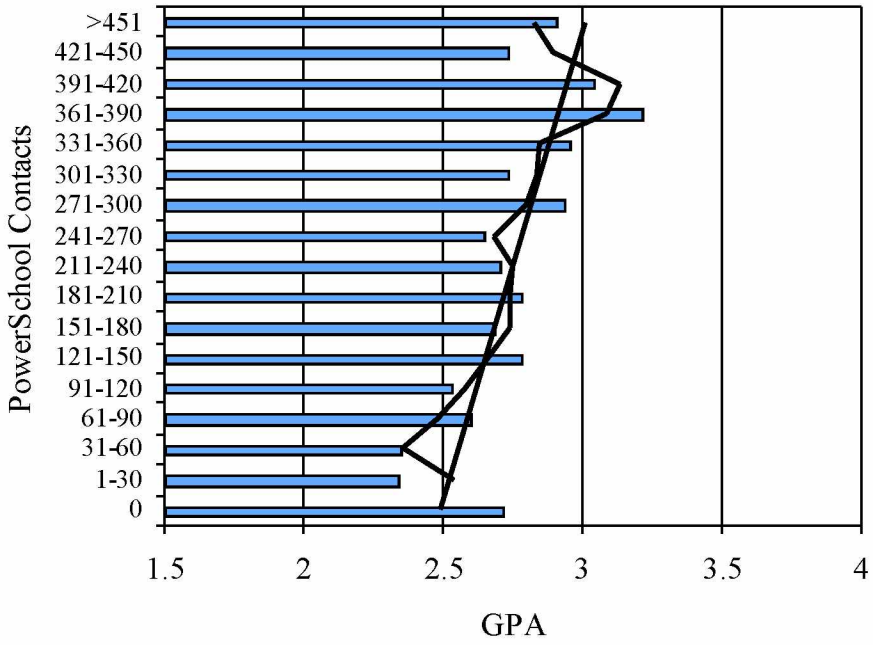

Figure 10 - 10th Grade (AY '08/'09) PowerSchool Contacts Compared to GPA

Overall trends are similar to the middle school results: a slightly positive relationship between contacts and GPA. High school families, however, seem to have taken to utilizing PowerSchool more from the start: the bulk of the population fell in the 31-120 contacts range (45.8%), a full increment up from the middle school records. The optimal GPA was attained by – again – a small group (five individuals, 0.6% of the population) at the 361-390 contacts range. Higher numbers of contacts did not result in higher GPAs for the 3.4% of the population contacting PowerSchool in excess of 391 times in '08/'09.

11th Grade Contact Trends and GPA

Table 7 and Figure 11 depict the records of the 11th grade records (n=820) grouped in increments of 30 contacts, with "0" contacts as a separate group and ">451" contacts as their own group. For these observations, two student records with extremely high numbers of recorded contacts were not included (in excess of 1000 contacts). These outliers inflated their group's averages by up to 11%, and were therefore excluded.

Table 7 - 11th Grade (AY '09/'10) PowerSchool Contact Trends and GPA

11th Grade PowerSchool Contacts	Student Records	Percent of Population (n=820)	Average Contacts	GPA
0	49	6.0%	0	1.98
1-30	50	6.1%	15	2.05
31-60	81	9.9%	46	2.62
61-90	100	12.2%	75	2.50
91-120	99	12.0%	107	2.62
121-150	94	11.5%	132	2.72
151-180	82	10.0%	166	2.87
181-210	60	7.4%	196	2.76
211-240	51	6.2%	226	2.89
241-270	35	4.3%	257	2.82
271-300	23	2.8%	286	3.13
301-330	25	2.8%	314	2.82
331-360	11	1.3%	346	2.66
361-390	18	2.2%	376	3.18
391-420	14	1.7%	408	3.28
421-450	1	0.1%	427	3.00
> 451	27	3.3%	643	3.22

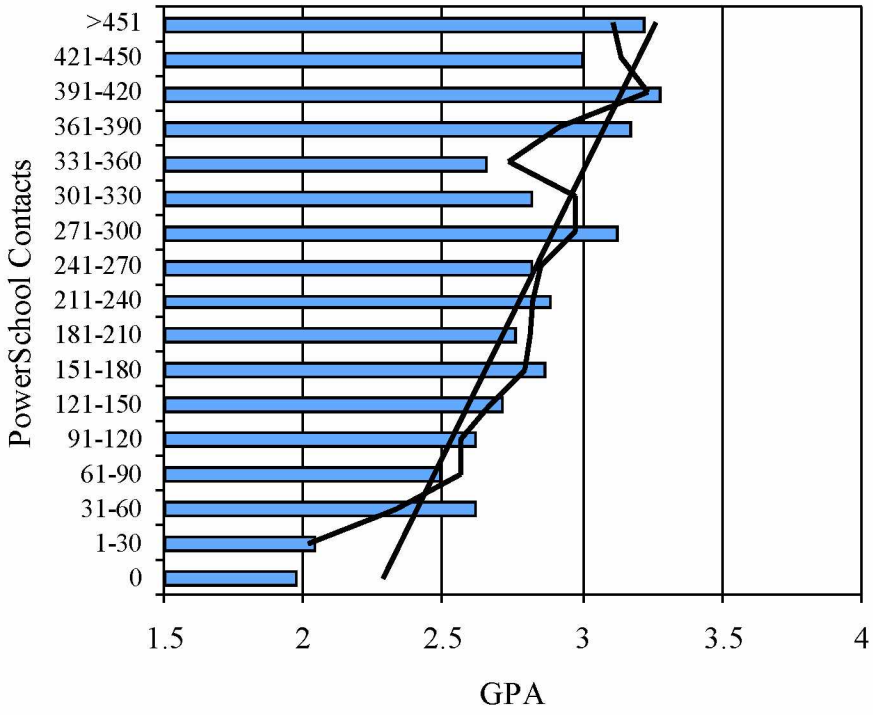

Figure 11 - 11th Grade (AY '09/'10) PowerSchool Contacts Compared to GPA

Continuing with the upward trend in number of contacts, the bulk of the population (35.5%) contacted PowerSchool between 61-150 times throughout AY '09/'10. Contrary to this trend, however, is a notable subgroup (49 individuals, 6% of the population) who recorded "0" contacts. This group also attained the lowest GPA of any in all four of the groups studied – 1.98. Looking back on the raw data, all but eight of the 49 had contacts recorded for the previous year. On the whole, however, the 11th grade figure shows a slight "peak" at the 271-300 contacts range (23 records, 2.8% of the population), a significant jump in GPA between the 1-30 and 31-60 groups (0.57), and the strongest trend line of all four groups.

DISCUSSION

Essential Findings

In spite of the results if the investigations indicating PowerSchool contacts and student GPA are closely associated, evidence suggesting PowerSchool utilization actually promotes student academic achievement is not forthcoming from this study. At the middle school level, contacts with the SIS increased 24% between the 7th and 8th grade years while average GPAs actually decreased by 1.4%. Similarly, contacts recorded by high school records increased by 20% while GPAs rose a mere 2.3%. There are indications that PowerSchool may yet become a factor both students and parents could utilize to promote student achievement with increased familiarity and enhanced self-efficacy. However, after two years of use within the Fairbanks North Star Borough School District, it appears PowerSchool utilization has had minimal impact in promoting student academic achievement.

Selection of the Records to be Included in the Study

As mentioned in the "Methods" section, student records needed two consecutive years of documented PowerSchool contacts and GPA data to be included in this study. This almost certainly resulted in an under representation of several subpopulations in the Fairbanks community. Nearly one in five records was discounted due to the absence of one or more values under scrutiny. The reasons contributing to missing data can be many and varied. Personal experience in the community leads me to believe that many of the incomplete records can most likely be attributed to the transient nature of the community. Two military bases continually rotating personnel and their families in and out of the community, a considerable percentage of rural Alaskans with strong cultural and familial ties to outlying villages spending part of the year in Fairbanks for a variety of reasons, and the highly transient nature of individuals attracted to the Alaskan way of life from the rest of the United States could all contribute to the high number of students not enrolled for two entire consecutive years. However, without demographic information

accompanying the student records, it is virtually impossible to even begin guessing which populations comprised the excluded records and what effect this could have had on the final results.

Trends in GPAs Compared to PowerSchool Contacts

The two analyses conducted to explore the possible correlation between the number of PowerSchool contacts during the academic year and student achievement reflected by their GPA yielded results suggesting that PowerSchool contacts are potentially associated.

First, using the SPSS program, several trends between the two variables as measured during the two academic years and grade levels yielded similar results at both the high school and middle school levels (Table 1). Scatter plots depicting GPA against contacts during the academic year show – literally – of scattering of data points from one year to the next. Both year groups figures show a relatively dense gathering of points in the AY '80/'09 year compared to the '09/'10 year where the points are more diffuse, indicating higher levels of contacts during the year. As this was the first investigation conducted in the study, it warranted further investigation.

Following the scatter plot investigation, a more detailed inquiry into the relationship between SIS contacts and GPA was explored. The results of this investigation are depicted in Figures 6 and 7. Both middle and high school results showed a strong association between the variables: on average, records with higher average contacts also recorded higher average GPAs. While this may not be a causal relationship, considering the intent and potential for PowerSchool to empower parents and students alike to promote academic achievement, the potential exists. However, evidence for this association was not supported by the population distribution: in spite of increased SIS contacts at all levels, the distribution of student records among the GPA levels was essentially unchanged, confirming earlier results that PowerSchool has not (yet) had a positive impact on student academic achievement.

Trends in PowerSchool Utilization

One of the stronger trends suggested by the data is the overall increase in contacts made to PowerSchool by families between the study years. Records from all achievement levels as well as grade-levels indicated significant increases in contacts - 22% for the study as a whole. Granted, while individual records showed both increases and decreases between years – with the single largest group being the '09/'10 high school population showing 49 individuals who had "0" contacts during their 11^{th} grade year – the population as a whole showed a positive trend.

The wide range of contact values is considerable. While the average middle school record had a value of 114 contacts and the average high school student recorded 145, a considerable number of each level recorded in excess of twice this number, some with number in the 800 and 1000 range. With only 180 student contact days in the school year and approximately 280 calendar days (including holidays, etc.) the dedication it took to make contact with PowerSchool over 1000 times in the course of a year is admirable. However, as the results indicate, this dedication did not always result is higher GPA. To the contrary, the maximum return-on-investment value with regard to PowerSchool contacts relating to higher GPAs appears to fall between 150 and 210 contacts per year for most groups studied. Not to be discouraging, however, a positive trend is seen across all Contacts vs. GPA comparisons (Figures 8 - 11). Therefore, while the figures may indicate little connection between the two variables, a trend is apparent, indicating that in general student records with more PowerSchool contacts are generally associated with stronger academic performances.

Trends Between Middle School and High School

Several notable trends were observed comparing middle school and high school data. Several results indicate that high school students and parents are putting PowerSchool to use improving student achievement more effectively than middle school students. Table 1 comparing Pearson's coefficient values indicates that high school students have closer associations between SIS contacts and GPA between years than

middle school students, indicating that PowerSchool contacts could in fact actually be instrumental in helping high school students and families promote student success. Granted, the correlation values are weak, but the increase in all comparisons between the two groups is noteworthy.

Another interesting comparison can be made among Figures 8 - 11, the series comparing SIS contact groups to GPA. The linear depiction (the line of best fit) on each of the charts decreases in slope as the series moves from 7th to 11th grade. This indicates a potential correlation between PowerSchool contacts and GPA, a correlation that increases with student age. This trend could have multiple factors influencing it – increased access to the internet via handheld electronic devices, an increased emphasis on academic performance as students near graduation and the college application season, or perhaps a blossoming interest in Tesoro's "Gallons for Grades" gas rewards program as teens obtain cars (and the associated expenses). Whatever the reason, at this point in the investigation it seems the factor of maturity has manifested itself as a potential influence on a student's academic achievement.

One other possible factor that could help explain the trends mentioned in this section is that one high school was selected to pilot the PowerSchool program the year prior to it's district-wide implementation. A population of approximately 400 students at one of the four high schools was introduced to PowerSchool as 9th graders – freshmen. Results from this study indicate familiarity with the system may be a factor in contact rates (based on increased contacts from the first to the second year of the study). It is possible this sub-population of high school students could have influenced the overall results for high school students to reflect higher correlation rates and more direct associations between GPA and contacts than might have otherwise been observed. However, without more information about the students, it is impossible to tell how many of these records were included in the study or what influence they may have had on the final results. (All middle school students in the study were new to the SIS, as PowerSchool was not introduced into the elementary schools until AY '10/'11.)

Reflections on Parental Involvement via SIS and Student Achievement

As suggested by research included in the "Literature Review", parent involvement in their child's academic progress is closely associated with academic success. Even though parental contacts with PowerSchool could not be analyzed and compared to student achievement in this study, parents are in fact utilizing PowerSchool to some extent – the memo from the FNSBSD superintendent's office in March 2010 indicated over 800 identifiable parent contacts at the high school level alone during the week of spring 2010 parent-teacher conferences, and this rate is likely underreported due to the parents contacting the SIS using their child's profile. However, this online involvement appears to be having minimal impact. As mentioned earlier, GPAs actually fell between the study years at the middle school level and rose only 2.3% in high school. While PowerSchool may offer another venue for parents to be involved in their child's academic performance, it is this researchers opinion that it has merely replaced more effective, personal, face-to-face interactions, with little tangible benefit to the student.

Future Investigations

This study was hampered by many limitations due to the restrictions on the release of student information. However, the objectives defined earlier in this study were essentially met; mainly, the correlation between the number of SIS contacts in an academic year and student achievement reflected by GPA suggested a connection, though enhanced student achievement was not associated with SIS contact. Typical of any investigation, however, this study has spawned more questions than it has resolved. Suggestions for further work are as follows:

1. To establish a more direct connection between parent utilization of SISs and student achievement, a study involving parents contacting the SIS exclusively using their own account and password could be designed. This investigation would require a control group if comparison to the general population was deemed inappropriate, though the ethics of asking parents to remain uninvolved in their child's progress may avert such a study.

2. A study including demographic information would potentially reveal trends in SIS utilization and student achievement across ethnic, cultural, socio-economic, and educational backgrounds. This would be especially useful in determining whether or not SISs have indeed provided a means for populations less likely to engage the educational system to be involved in their child's education.

3. A longitudinal study following one (or several) groups over the course of their education observing the trends studied in this work (SIS contacts and GPA) would lend insight into the evolution of SIS acceptance, usage, and affect on student achievement. This study attempted to do this, but with only two years of recorded data it only revealed the first chapter in what could prove to be an epic transformation of our educational system.

4. An investigation to explore ways in which PowerSchool could be better utilized to enhance student achievement would probably yield the most direct benefit for all involved – parents, student, and teachers alike. While it may not meet the definition of "research", perhaps the most expedient means of accomplishing this goal would be a survey. Areas of investigation may include assessing current SIS use rates, restrictions to SIS use, actions taken after contact has been made and student deficiencies identified, as well as an open-ended response section.

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