K-12 Education and Technology in the 21st Century

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K-12 Education and Technology in the 21st Century

An analysis of Social Media and Public High Schools in Massachusetts

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I would like to thank Professor Taylor Boas of the Political Science Department for his role as my advisor throughout the year. His insight and advice were crucial in the formulation and development of my model and analysis. Thank you very much Professor Boas. I would also like to thank my classmate/colleague Rajani Ghosh for her assistance, advice, and feedback throughout process of creating this study.
ABSTRACT

This paper explores an emerging phenomenon in the 21st century – social media – and its effects on public education. Increasingly, educators in K-12 and higher education have incorporated social media practices to different degrees and for different functions to support the overall progress of their institutions. The field in general has mixed reviews on the overall benefits social media can provide in educating students or assisting with other education-related functions. In regards to educating students specifically, some scholars and educators praise the use of technology and social media in their efforts to improve academic performance. However, others have raised many concerns with social media suggesting that it actually lowers academic performance and has other deleterious effects on students. Concerns with privacy also take center stage in the debate, especially within social media use for younger cohorts in K-12 education.

Accordingly, this study looks to explore the relationship between social media and public education, specifically through looking at public high schools in Massachusetts. In utilizing survey data submitted from 35 high school Principals and other administrators throughout the state, SAT scores, and other education indicators from the Massachusetts Department of State, I look to explore some of the questions between these two.

Using multivariate regressions, the data suggests some surprising results; it is evident that schools in higher socio economic areas adopt social media at higher rates than schools in lower socio economic areas. Additionally, though there were no significant findings regarding the types of schools which are using social media or how social media affects a student’s outlook, ambitions, or motivation towards higher education/graduation, the data suggests that social media has a negative relationship with SAT scores. This data was substantively and statistically significant across two indicators for social media and SAT reading, writing, and math scores.
More research, including times-series data, is needed to prove a causal relationship between the two – many schools and districts are only recently adopting social media technology into their curriculum.
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EMERGENCE OF SOCIAL MEDIA

In the last decade, the use of social media has exploded among populations across the world—an interesting phenomenon considering social media has also emerged within the last ten years. Social media, also commonly referred to as social networking site, can be defined as the platforms which enable the interactive web to engage users to participate in, comment on, and create content as a means of communicating with their social graph, other users, and the public in general.¹ Some key characteristics that are important when describing social media but not its only functions are a variety of content formats including video, text, photographs, audio, PDF, and PowerPoint and interactions across different social platforms through sharing and newsfeeds.²

These platforms that allow users to interact online via content sharing, status updates, and other mediums have been popular since their inception in the last decade. According to Charles Davis et. al, there are over 750 million Facebook users and 100 million Twitter users worldwide.³ Additionally, he also reports that 90% of college students have a Facebook profile.⁴ These numbers will continue to grow as the next generations continue to interact with the online world and create profiles on many different social media sites. In fact, for many young adults and teens, they cannot fathom a reality without Facebook, Twitter, and a number of other social apps that are continued to be developed in a world of rapidly developing and changing technology. However, though social media sites like Facebook and Twitter have successfully penetrated our

² Cohen, “30 Social Media Definitions.”
³ Charles Davis and others. Social Media in Higher Education: a literature review and research directions. The Center for the Study of Higher Education at the University of Arizona.
⁴ Davis and others. Social Media in Higher Education: a literature review and research directions.
society and lifestyle, the effects of social media on many other areas of society have yet to be explored.

At the same time as this explosion of social media, scholars, policymakers, and others have been working to fix what is arguably the biggest domestic issue in the United States today—a declining education system. More specifically, concerns from these groups regarding our education system derives from such indicators as the PISA international rankings, in which the US ranks 14th in reading and 25th in math in comparison to other countries. Additionally, obstacles such as the achievement gap, a decline in Science, Technology, Engineering and Math (STEM) education, and dismal graduation rates in big urban cities have also plagued a stagnant US public education system. In the midst of this crisis in our public education system, many companies, nonprofits, policymakers and other entrepreneurs have all been creatively developing new ways to educate our public school students through such initiatives as charter schools, the recruitment of young graduates from a variety of different fields to teach in public schools, mentorship programs, and other experimental initiatives; yet it remains to be seen the role that social media can play in improving public education in the US.

Accordingly, how has technology and social media been used in our public education system to improve the education that future generations receive? Currently, the academic effects of social media tend to be a largely unexamined area of study by both policymakers and academics alike. Fortunately, there have been some studies done on the degree to which social

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6 Achievement Gap: A significant difference in academic performance between low income, minority students and high income, Caucasian students. In many studies, this gap has been attributed to concentrated poverty in high urban areas where minorities are disproportionally represented. Many policymakers and educators today have looked to create significant redistributive policies which look to reduce this gap in education.
media is currently being used by schools, especially in higher education, as well as its effects on social interaction and student participation.

SOCIAL MEDIA IN HIGHER EDUCATION

With the increase in social media usage within education, it is evident that colleges/universities use social media more than any other education cohort. In his article on social media and higher education, Mark Blankenship notes that in a recent survey of 1000 colleges and universities conducted by the Babson Research group, the survey revealed that 80% use social media in some capacity and more than half use these tools as a part of their teaching.7

One way in which universities have been adopting this social media in their classrooms is through the use of ‘avatars’ within online worlds created by the college.8 Briefly, an avatar can be defined as an online profile which is usually visualized by a fully customizable, computerized figure. At many universities such as the Lake forest Graduate School of Management in Illinois and Boise State University’s College of Business and Economics, online MBA programs have begun using a virtual, avatar-based learning environment for students. This program, which was created and continues to be maintained by the educational technology company Vertical Learning Curve (VLC), allows students to interpret office situations, make business decisions, and ‘network’ with other online avatars through a virtual, corporate online setting.9 Though it may seem like a strange concept, 200 to 300 additional MBA programs are currently in the VLC’s training stage to adopt similar programs at their own institutions. The biggest reason

9 Ibid.
being – the evidence suggests – is that these online learning environments are an improvement to ‘click and snore’ passive online courses by allowing their users to engage in an interactive experience.10

In addition to opportunities to provide a virtual experience for students within a classroom, many scholars have also noted the strides colleges have made towards incorporating social media into their recruitment strategies to help build relationships with students during the college application process. In his article on college admissions and Facebook usage, Ryan Lytle reports that a growing trend has emerged among college admissions officers who look to utilize Facebook as a means to reach out to prospective students, and gain insight on the backgrounds of their current applicants to supplement test scores, personal statements, and applications.11 Interestingly enough, this trend will continue to grow. In a recent survey of admissions officers at 359 colleges and universities, 24 percent reported to using Facebook or other social media sites to research an applicant.12 This is a very significant trend considering Kaplan Test Prep administered a similar survey in 2008 which only found that 10 percent of college and universities were using social media in this manner.13 In regards to the K-12 education, an increase in social media use to attract prospective students may be very useful in incentivizing and informing students on the benefits to a college education and a college experience.

Along similar lines, Davis asserts that “nearly all of what is widely known about the use of social media technology in higher education has been documented in…colleges and universities where it tends to be utilized as a la carte communication for…departments, offices,

12 Ibid.
13 Ibid.
and administrative faculty…” Additionally, the author provides a comprehensive list of ways in which social media is currently being used in higher education in four different realms: learning/academic, student support, community building, and expanding connections (APPENDIX 1). Some notable ways in which colleges are using social media that Davis highlights are through online mentorships, uploading online lectures and assignments, creating online groups for students to study and complete assignments jointly, and build and strength campus community.

Ultimately, this suggests that the social media use in colleges and universities is beginning to be incorporated into the practices of professors, faculty departments, and administrative offices for a variety of different purposes. However, many scholars have already noted that higher education currently has the highest degree of social media utilization within their schools, so what have K-12 educators done to incorporate social media into their curriculum, especially at the high school level, either formally or informally?

SOCIAL MEDIA IN K-12 EDUCATION

Though it is evident that social media usage is not used to the degree of higher education due largely to many privacy concerns, social media in K-12 education has seen some promising developments—mainly through the efforts of innovative teachers and other faculty. All over the country, amazing teachers have used social media to bolster their student’s participation and performance. In many schools, teachers have begun utilizing social media for vital academic purposes including updates to their students regarding assignments, lectures, and other important matters. In some cases, teachers have even permitted students to add their Facebook profiles,

14 Davis and others. Social Media in Higher Education: a literature review and research directions, 4.
15 Charles Davis and others. Social Media in Higher Education: a literature review and research directions, 11.
16 Ibid, 11.
personal Twitter handles, and other social media identities so that students can contact them
instantaneously for any problems or questions they may have.17

Along these lines, the Duke University Center for Instructional Technology has
recommended six ways in which social media should be used in education—all of which are
applicable to K-12 Education. They suggest that social media can be used in the following ways:
sharing information with classmates; gathering information when abroad or doing research;
showing personal academic interests with a broad audience; using sites like Twitter to keep
students engaged and see what they are thinking about during instruction; forming student study
groups; and adding social tools to e-textbooks for collaborative purposes.18

In Chicago, Jeff Scheur, an English teacher at Whitney Young High School, created an
app called ‘NoRedInk’ for smarts phones, iPads, and other mobile devices that would allow his
students easy access to correct common grammatical mistakes that they were making in their
papers.19 NoRedInk allows teachers to create personalized lesson plans for each student, track
their progress, and provides instant feedback on any new issues that arise.20 As Jeff puts it, he
was tired of “spending 40 hours a week grading papers…giving them back to the kids, and not
seeing the return…the way the feedback was structured, there wasn’t any expectation that they
would get better…in order to make use of my feedback, I provided them an interface for

18 Lynne O’Brien. “Six Ways to Use Social Media in Education.” Duke Center for Instructional Technology. April
http://www.usnews.com/education/blogs/high-school-notes/2012/05/21/teacher-developed-apps-fill-lesson-gaps
(Accessed Fall 2012).
20 Ibid.
practicing.” Currently, there are more than 13,000 registered users ranging from grades 5 through college on NoRedInk.

Schuer’s example provides great insight on the capacity for social media in K-12 education, that is, the capacity to create. With many social media sites and tools that are currently available, many teachers have now been taking the initiative and developing their own apps or using social media platforms to improve student performance. In her classroom, English teacher Rosie Miles describes how she incorporated the popular status update platform Twitter into the understanding of the literature. In an online discussion via of Charles Dickens *Bleak House*, Miles challenged her students to adopt the role of a character in the play and engage in an online dialogue with one another assuming the role of this character. In order to be productive in this assignment, she notes, “students have to read the novel carefully and well.”

At this point, it is interesting to note how two different teachers from two different regions were able to adopt different forms of social media to achieve goals for their classroom; conversely, the evidence suggests that social media has not nearly reached its full potential in many other subject areas which could benefit from its utilization. In fact, many scholars advocate for high social media use in Science, Technology, Engineering, and Math (STEM) education as a means to increase interest in STEM subjects and connect students to professionals working within their areas of interest. In Grosse Point Public Schools of Detroit, George Washington University student William Broman describes how the district has increasingly adopted the use

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21 Ibid.
22 Ibid.
24 Ibid.
of Twitter and social platform Google +.\textsuperscript{25} During the annual cardboard boat regatta, physics teachers work with students in a competition to design and build the best cardboard boat. During the most recent build-off, Broman describes how students began publicizing and promoting the event on Twitter – resulting in the most successful turnout and participation yet.\textsuperscript{26} The author also suggests that STEM fields which incorporate social media for events like the boat regatta can take their promotions and interests a step further “by allowing a student to contact and work with a US Navy shipman, an engineer…to gain insight on how to build the best cardboard boat.”\textsuperscript{27} This in turn, may help re-kindle a spark in interest for STEM fields.

Alongside these examples of teachers utilizing social media to improve the learning environments in their classroom, a recent study by Junco et al, one of the only quantative studies currently that examines the effects of social media on students’ academic performance, found that the popular social media site Twitter had a positive effect on grades for college students. Junco et al found that those in the experimental group who utilized Twitter had higher levels of engagement and higher semester grade point averages than those students who did not.\textsuperscript{28} The authors contend that this positive relationship is due largely to the fact that communications via Twitter allowed students and faculty to engage in ways that transcended traditional classroom activities.\textsuperscript{29}

In addition to utilizing social media for sparking interest in the classroom, it also becomes a very important tool for allow teachers, principals, and other school faculty to connect with one another. In a recent study done on K-12 educators and social networking, most

\textsuperscript{26} Broman, “High Schools Need to Use Social Media to Spur STEM Engagement.” \textit{U.S. News Education}.
\textsuperscript{27} Ibid.
\textsuperscript{28} R. Junco, The effect of Twitter on college student engagement and grades. \textit{Journal of Computer Assisted Learning}, 27(2)
\textsuperscript{29} Ibid.
principals indicated that social networking sites have value in education as a way for educators to share information and resources, create online professional learning communities, and improve school-wide communities with student and staff. The same survey also found that principals were 56 percent likely to utilize webinars, 36 percent likely to use YouTube, and 28 percent used podcasts for professional purposes.

Furthermore, alongside increases in principal usage and involvement in social media, teachers have also become more involved in social media use, especially for collaborating and sharing information with other teachers. Classroom 2.0, a social networking site which allows teachers to interact, share information, and comment on lesson plans is one such example as to how social media has become important in how teachers teach. Lee suggests that because of Classroom 2.0 and many other similar social networking sites, “the conversation is happening within a safe space independent of any education entity, the topics are limitless…has given teachers previously without a voice an opportunity to be part of the conversation.” These claims are bolstered by the fact that, in 2009, 64 percent of teachers had stated that they had joined one or more social networks—a number which could be steadily increasing.

Accordingly, while research thus far suggests that the primary use of social media in K-12 education has been for collaborative purposes, many consider social media to be a double-edged sword. While social media may bring unprecedented levels of collaboration among students and others, opponents assert that it comes at the risk of privacy concerns which inevitably come with having so much information publicly available for online viewing. It is

32 How educators use social media to change learning paradigm
important then, to explore the degree to which social media does invade privacy; how serious is the potential for major limitations in social media as a tool for education; and how students, teachers, and other educational actors feel about it.

THE DOUBLE EDGED SWORD: PRIVACY AND SOCIAL MEDIA IN EDUCATION

In comparison to the conventional teacher-student relationship, social media offers an unprecedented capacity to expand the relationship past classroom and school hours. With teachers, students, and other groups involved in the education process being able to engage and interact with each other past regular school hours through a simple friend confirmation on Facebook, an add on LinkedIn, a follow on Twitter, or another form of social media interaction, the evidence suggests that there is also the potential for many privacy concerns including inappropriate interactions between students and teachers online; the capacity to build an informal relationship with a teacher that leads to a lack of formal structure during classroom time; and online student bullying. In a more colorful perspective on the use of social media outside of the classroom, Psychiatrist Carol Lieberman suggests that social media is “a gateway to sexual misconduct and illegal relationships.”34 Additionally, she describes social media as being similar to “being at a bar…it’s conducive to socializing and not something that is related to school.”35 Many teachers also feel that social media has distorted the teacher-student relationship. Iris Fanning, a teacher from Albuquerque, New Mexico, argues that social media has taken away from the clear wall boundaries between students and teachers and major concerns arise when students begin to see teachers as peers instead of an authoritative figure: “You still have to have

35 Ibid.
those boundaries…I think we’ve gotten away from that ethically in education...we…are supposed to be mentors and teachers—not friends.”

Along similar lines, many scholars have also noted the negligence that that many social media users take in protecting themselves from privacy breaches. In a study done on social networking in education, Zaidieh reports that “users will express very powerful concerns about privacy of their personal information, but be less vigilant about safeguarding it…users are progressively more comfortable with displaying a great deal of personal information online.”

This is especially concerning considering K-12, all of which who are minors with little to no experience on the implications of their actions. K-12 students may be even more inclined than the average adult to publish their personal information on Facebook or some other forms of social media without fully considering the ramifications of their actions.

The privacy concerns that come with adopting social media are important and inevitable. Surprisingly, however, in a recent survey administered by Children’s Mercy Hospitals and Clinics, 72 percent of parents said it is good preparation for future involvement in a technology-dependent work world for their kids to participate in social networking. Fifty-seven percent of parents also stated that social networking helps kids to be open minded, worldly, and creative while 59 percent of parents believe that social networking helps their student work with others.

Considering the privacy risks involved in utilizing social media, it is evident that a majority of parents still feel that there are potential benefits to its use.

39 Ibid.
To curtail privacy concerns, educators and others are finding ways to root out the risk for inappropriate relationships or other deleterious outcomes of privacy breaches. Recently, Facebook has collaborated with the Internet Keep Safe Coalition and the American Social Counselor Association (ASCA) to develop a school guide called “Facebook for School Counselors” which seeks to train school counselors on how to use Facebook and teach students the best practices on the social network.40 This guide, the committee states, looks to help develop school policies; respond to online incidents; detecting at-risk behavior on Facebook; and dealing with how the students represent themselves on the platform.41 As a result, the article suggests, counselors will be able to act as a pseudo-online police for the students by better detecting online bullying incidences, reporting offenses to Facebook, and recording the harassment or abuse within the school or district as well.42

Considering the imminent integration of social media for school purposes, it is comforting to see collaboration between counselors, schools, and the social media outlets themselves in monitor privacy concerns; some districts have even gone as far as creating privacy guides for their own faculty to educate their staff on social media. In the San Bernardino City Unified School District (SBCUSD), the largest school district within the Inland Empire in southern California, the safety officers for the School Police Department recently released social media ‘smart cards’ for popular sites Google +, Twitter, and LinkedIn to educate district employees and students on social media (APPENDIX 2). These smart cards provide ‘Do’s and Don’ts for Social Networking’ including recommendations such as only establishing connections

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41 Ibid.
with people you know and not posting pictures of family or yourself that clearly show your face. They also provide step-by-step instructions and accommodating visuals which guide users through each site's privacy settings to ensure they have the safest settings possible activated for their profiles.43

OTHER DRAWBACKS TO SOCIAL MEDIA IN EDUCATION

Along with privacy concerns, groups against social media in education have argued that there are other drawbacks to incorporating social media technology into our education system. While proponents highlight the positive benefits that social media brings regarding collaboration, creativity, participation, and technological familiarity, scholar Mark Connolly suggests that social media both “simultaneously seizes and fragments our attention. They can subvert higher-order reasoning processes, including the kind of focus, concentration, and persistence necessary for critical thinking and development.”44 The author also points out that researchers have found that heavy internet use is correlated with “greater impulsivity, less patience, less tenacity, and weaker critical thinking skills.”45 Similarly, Neil Selwyn has suggested that social media has changed the way people learn; he suggests “learning can be conceived in terms of the capacity to know more via social media rather than a reliance on the individual accumulation of prior knowledge in terms of what is currently known.”46 He adds that learning in the social media age has placed an emphasis on the ability to access and use distributed information on a ‘just-in-time’ basis.47 In other words, similar to Connolly’s point, opponents and scholars argue that

43 See Appendix 2
45 Gamoran, Benefits and Drawbacks of Social Media in Education.
47 Ibid.
social media creates a reliance on a get-quick, one-sided answer which materializes
instantaneously without the need for deep, critical intellectual engagement to a question.

Another criticism offered by opponents of social media in education deals with
collaboration. While many proponents offer many positive aspects on collaboration in education
utilizing social media, opponents suggest that collaboration via social media may not necessarily
be a good thing. In fact, the lack of features on a social media site, especially for a large colleges
and universities, can lead students to feel disconnected from the university; this disconnect
produces feelings that the university does not care about them, which, in turn, produces
sentiments of distrust.48 Stephen Downes would agree with this notion that, while social media
may lead to engagement, it also may lead the opposite outcome with students feeling less
engaged if the sites are not well put together and lack one-on-one features. The author states that
“even the best-intentioned universities are able only to offer their student an artificially regulated
and constrained engagement with social media…universities are seen to face distrust and a
growing loss of faith amongst younger generations.”49 These scholars would suggest that the
kind of collaboration that social media offers students is not conducive to a productive learning
environment—it actually hinders it by providing a digital, falsified perception of engagement
which can negate one-on-one human interaction; social media may have some benefits, but only
at a very limited capacity and not necessarily for direct student performance.

SOCIAL MEDIA IN EDUCATION—WHERE DO WE GO FROM HERE?

Taking both sides into account, it is clear is that the intellectual debate on social media
use among education scholars is still developing – more research and studies are needed.

48 Pros and cons picture chart
49 Stephen Downes, ‘Deinstitutionalizing education’, Huffington Post, 2 November 2010,
www.huffingtonpost.com/stephen-downes/deinstitutionalizing-educ_b_777132.html.
Interestingly enough, both sides highlight major points on the same coin, that is, collaboration/engagement and performance/learning—with each side presenting the opposing arguments. The Pros and Cons of Social Media provided by onlineuniversities.com (APPENDIX 3) provides an insightful visual review on many of the pros and cons described thus far.

So where do we go from here? Regardless of one’s views of social media’s role in education, two things are evident from the research by scholars thus far.

First, it is evident that social media has emerged—and it is here to stay. With over 750 million Facebook users, 100 million Twitter users, and the proliferation of new social media sites daily, it is difficult to fathom a scenario where schools are successful in detaching themselves from this online media revolution. With the majority of teachers and principals now adopting social media sites for use within their personal lives and virtually every student in the upper grades of K-12 education and higher education having some experience or some exposure to social media, it is apparent that social media will not be going anywhere any time soon. Though some individuals and groups may oppose social media in education, they may not be able to stop its immersion into education – only temporarily hinder it.

Second, considering the work done by scholars, the evidence suggests that effects of social media on education remains a largely speculative, unexplored area of study—especially in regard to the quantitative effects of social media, if any, on K-12 education. This reality can be explained largely by the fact that the emergence of social media, especially into education, is a largely recent phenomena and its effects may not be readily apparent or may be premature in providing significant results to scholars. Thus, it now becomes important for scholars to engage in research that examines the effects of social media on education—the primary purpose of this
study. As a whole, this study looks to build off of research conducted by scholars by adding a quantitative component in exploring the effects of social media in high school education, if any.

**SOCIAL MEDIA AND PUBLIC HIGH SCHOOLS**

In conducting my research, I propose three hypotheses on the relationships between social media and education: first, I look at the relationship between social media and socio-economic differences within schools by exploring such indicators as the percent of low income students, average class size, and percent of limited English proficient students; in exploring this relationship, I posit that those schools with higher socio-economic status will have higher uses of social media than schools in lower socio-economic areas. I believe that schools with other positive external and internal factors such as high wealth within the school and community in general and lower student-teacher ratios, will be more likely to afford and try new innovative strategies to use to teach students and collaborate with faculty in general.

Second, I explore the relationship between social media use and academic performance. In looking at this potential relationship, I assert that as social media usage increases, a student’s academic performance will also increase. Due to the dynamic, interactive nature of social media, it has the capacity to help students improve in their academic performance.

Finally, consistent with many other studies on social media and education, I hypothesize that as social media usage increases, a student’s motivation, ambition, and outlook towards higher education also increases. The evidence thus far has showed that social media can provide an opportunity for students to interact with professionals, alumni, and other mentors; build a student’s social network; and, introduce them to new professions/opportunities which require
higher education, assist them directly with challenging assignments, and motivate them to advance further in high school and college.

Overall, I look to explore three hypotheses in an attempt to answer the question: what effect does social media have on education? Briefly, the three hypotheses are:

1. *Schools in areas of higher socio-economic areas will have higher rates of social media usage than schools in lower socio-economic areas.*

2. *As social media usage increases, a student’s academic performance will also increase.*

3. *As social media usage increases, a student’s motivation, ambition, and outlook towards higher education also increases.*

OPERATIONALIZATION AND TESTING

Thus far I have made three significant claims on the potential relationship between social media usage and education. In this section, I describe exactly how each hypothesis will be operationalized and the model I will be using to test each hypothesis.

In exploring a possible answer for each of these hypotheses, the data I have collected in order to answer these questions comes largely from the Massachusetts Department of Elementary and Secondary Education (MA ESE). More specifically, I will be using data which reports a high school’s performance on SAT scores and graduation rates. Some other important data sets which will be used from MA ESE are economic and social indicators including average classroom size, percent of limited English proficient (LEP) students, and percent of low income students.

Additionally, in order to measure social media use in each high school, I composed and distributed a 20 question survey to the principals at 377 public high schools across the state of Massachusetts. The survey asked questions that sought to answer four big questions, that is, to
what degree do high schools in Massachusetts use social media, either formally or informally for educational purposes; which education actors (students, counselors, teachers, administrators, alumni) utilize social media for education purposes; how do these groups utilize social media; and, finally, what effect has social media use had on student performance? For the sake of this study, I created two social media variables based off of survey responses to two questions: how many social media sites are used; and in what ways are these social media sites used? The survey questionnaire is contained in Appendix 4

**RESPONDENTS AND THE POPULATION**

Accordingly, out of a possible 377 schools, I had 37 schools which completed the survey in its entirety and will be used for this study. In most cases, the respondents to these surveys were the high school principals, though in a few cases there were other administrators such as a Vice Principal or a Counselor which responded on behalf of the school.

In striving to attain a representative example, to my surprise, the 37 schools actually resemble the population of public high schools in Massachusetts well. In comparison on key statistics including AP score performance, SAT scores, graduation rates, and other categories, each sample resembles the population similarly.

**FIGURE 1: DISTRIBUTION OF AP SCORES FOR ALL PUBLIC HIGH SCHOOLS VS. SURVEYED SCHOOLS**
FIGURE 2: DISTRIBUTION OF SAT SCORES FOR ALL PUBLIC HIGH SCHOOLS VS. SURVEYED SCHOOLS

2A. SAT READING SCORES

2B. SAT MATH SCORES

2C. SAT WRITING SCORES
FIGURE 3: DISTRIBUTION OF GRADUATION RATES FOR ALL PUBLIC HIGH SCHOOLS VS. SURVEYED SCHOOLS

FIGURE 4: DISTRIBUTION OF SCHOOLS BASED PLANS AFTER GRADUATION FOR ALL PUBLIC HIGH SCHOOLS VS. SURVEYED SCHOOLS

FIGURE 5: DISTRIBUTION OF LOW INCOME STUDENTS FOR ALL PUBLIC HIGH SCHOOLS VS. SURVEYED SCHOOLS
Overall, looking at Figures 1-7, it is evident that the variance in the sample and population are very similar to one another which suggest that the sample is representative of the population. Most schools in both the sample and population have AP and SAT scores near the median; low rates of limited English proficient students; average class sizes ranging from 15-35; significant fluctuations in terms of low income students; and high rates for plans on four year private and public schools.
COMPOSITION OF SAMPLES BASED SOCIAL MEDIA SURVEY

After administering the survey and collecting responses from 37 respondents, here is how the schools broke down in terms of how they were using social media; what types of social media were being used; and what groups were utilizing social media/to what degree:

FIGURE 8: SOCIAL MEDIA COMPOSITION OF RESPONDENTS

8.1. TYPES OF SOCIAL MEDIA USED IN SURVEYED SCHOOLS
8.2. WAYS IN WHICH SOCIAL MEDIA IS USED IN SURVEYED SCHOOLS

8.3. FREQUENCY OF KEY GROUPS USING SOCIAL MEDIA
Overall, responses from the surveyed schools provide some interesting findings on how social media is used, which ways are most commonly being used, and what types of social media are used. First, the data suggests that the most commonly used forms of social media are not necessarily education-centered. Though Khan Academy is the fourth most popular response, the top three sites were Google +, Facebook, and Twitter – with Skype and Pinterest also ranking in
the top half and most other education-centered platforms ranking in the bottom half. Though many other education-specific sites were excluded from this survey, due to the fact that there are hundreds of sites and programs, it is surprising to see that so many schools are using mainstream social media sites considering the privacy concerns that many K-12 administrators and policymakers have raised.

Second, the data shows that social media is actually used in the classroom for a wide variety of both synchronous and asynchronous activities not just exclusively for online materials which supplement instruction as previous research would suggest. Many teachers have praised social media for the fact that it allows teachers to use online, multimedia presentations in their classrooms to teach students; however, the fact that status updating and blogging scored high responses suggests that teachers and schools are also using these resources to directly engage students and enable them to learn without the direct assistance of teachers. As anticipated, alumni and student interaction along with file sharing – which previous studies suggest are the most common uses among K-12 education – were high in the responses.

Finally, it is evident that most groups have are similar in regards to the frequency and responses of which groups are using social media – with the exception of administrators. Responses for administrators were just as high as other groups; a majority of responses were in the ranges of 3-4 – which indicates high social media use. This shows that administrators are using social media more than other groups. On the other hand, since most of the responses came from administrators, it is obvious that they are more aware of the degree to which they personally use social media and can provide a more confident answer; in answering on behalf of other groups, however, they may stick to the center/low frequency ranges to provide a conservative response.
VARIABLES REPRESENTING SOCIAL MEDIA RESPONSES

In order to operationalize the most important findings from my survey, I created two variables to represent different aspects of social media to use in the regression. The first variable is ‘Social Media Use.’ Social Media Use represents the aggregate number of social media types from figure 8.1 used by each of the respondents. For example, if a principal indicates that a school uses Twitter, Facebook, and LinkedIn in their school, the variable codes their response as ‘3’ – the total number of social media types they use out of all of those listed. The second variable I created to represent findings from the survey is ‘Types of Social Media Use.’ This variable represents the aggregate number of ways in which groups/individuals are using social media – represented in figure 8.2. In this case, if a principal indicates that a school uses social media for blogging and status updating, for example, they will receive a score of 2.

Figure 9 shows a visual breakdown of the variables ‘Social Media Use’ and ‘Types of Social Media Use’. In both variables, many of the responses list no social media use and, in turn, no ways in which social media is used.

FIGURE 9: DISTRIBUTIONS FOR VARIABLES ‘SOCIAL MEDIA USE’ AND ‘TYPES OF SOCIAL MEDIA USE’

9.1 SOCIAL MEDIA USE
9.2 TYPES OF SOCIAL MEDIA USE
Accordingly, these two social media variables, in conjunction with the academic performance, graduation, and other indicators like percent of low income students, percent of limited English proficient students, and average class size will be used to operationalize the variables in each of the three hypotheses.

**HYPOTHESIS 1**

*Schools in areas of higher socio-economic areas will have higher rates of social media usage than schools in lower socio-economic areas.*

In finding a response to this question, I first operationalize each of the variables in the hypothesis. For the independent variable, I will be using percent of low-income students and controlling for average classroom size and the percent of limited English proficient students to gain a better sense of whether there is a significant difference for schools in lower and higher socio-economic areas on their usage of social media. For social media use, the dependent variable, I measure this variable using the created variable from the responses from my survey – ‘Social Media Use’ and ‘Types of Social Media Use’.

In order to test this hypothesis, I will be using a multi-variate regression looking at how ‘Social Media Use’ and ‘Types of Social Media Use’ fluctuate when regressed with percent of low-income students, average classroom size, and the percent of limited English proficient student to see if there are any substantive findings.
HYPOTHESIS 2

As social media usage increases, a student’s academic performance will also increase.

Similar to the operationalization of hypothesis 1, social media use will be operationalized using the created variables ‘Social Media Use’ and ‘Types of Social Media’. To measure the dependent variable, I will be using SAT test scores to measure academic performance. Though these SAT scores do not provide a comprehensive conclusion on academic performance, I chose it to measure academic performance for three reasons: first, in our current education system, policymakers, educators, and other emphasize the importance of gaining high test scores on these tests because the SATs are required by most colleges prior to applying. Second, in comparison to many other indicators such as looking at individual assignments for students which would take an extraordinary amount of time and resources and state testing which are low stakes tests and may not provide an accurate measurement of student performance, most students have an incentive to work hard and try on the SAT tests. Finally, data on high school academic performance is limited generally. All of the data sets providing school academic and social characteristics in this study are from the Massachusetts Department of Elementary and Secondary Education—the entity which is most likely to have the most recent and most accurate data on true academic performance from their public high schools.

Initially, I had sought to use AP scores as an additional indicator. During the analysis stage, I decided to exclude AP scores and utilize SAT scores for the following reasons: first, SAT scores are a better indicator to gauge an entire school population instead of just the brightest students who are tracked into AP classes; second, the schools who reported scores to the Massachusetts DOE are more likely to have higher scores than those who did not; and finally, the AP score indicators were based off total number of passing scores over the percentage of
students who passed which would bias the results in favor of schools with more test takers – not necessarily the schools in which students are more successful in AP classes. While SAT scores also have some discrepancies, the evidence suggests that it provides the largest, most representative population and it is a quality, feasible indicator in testing academic performance considering time and resource constraints and limited data by the Massachusetts DOE.

Similar to the first hypothesis, I will also be using a multivariate regression to examine the effects of social media usage and academic performance. However, in order to more accurately gauge the relationship, I will control for percent of low-income students, percent of limited English proficient students, and average classroom size.

**HYPOTHESIS 3**

*As social media usage increases, a student’s motivation, ambition, and outlook towards higher education also increases.*

Similar to my other hypotheses, to test the relationship between social media usage and a student’s motivation, ambition, and outlook towards higher education, I will be using a multivariate regression. Social media, the independent variable, will be operationalized using ‘Social Media Use’ and ‘Types of Social Media Use’. Many of the same justifications for why these variables are useful in my two previous hypotheses continue to apply here – it is the most effective way in gauging and synthesizing the responses from my survey into two indicators.

Additionally, to measure a student’s motivation, ambition, and outlook on higher education—I will look at the graduation rate results from the respective school respondents published by the MA ESE. By using these two indicators, I hope to explore some of the ‘intangible’ effects of social media that academic performance results will inevitably leave out.
Many scholars and policymakers have criticized our over-emphasis on quantitative results like testing to measure academic performance, so it is my hope that by looking more generally at graduation rates, I will be able to gauge if social media provides students with a place to motivate themselves, think more ambitiously, and have a more positive outlook on higher education and its benefits.

RESULTS AND DISCUSSIONS

HYPOTHESIS 1

*Schools in areas of higher socio-economic areas will have higher rates of social media usage than schools in lower socio-economic areas.*

After performing multivariate equations using variables for social media use and the types of social media use along with low income students, average class size, and percent of limited English proficient students, there are statistically and substantively significant findings from this model. Table 1 provides some interesting findings on the rates of social media use when increasing average class sizes, low income students, limited English proficient students, SAT scores. In most cases, there are statistically significant findings consistent with the table below (APPENDIX 5).

Table 1

<table>
<thead>
<tr>
<th>Social Media Use</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT Reading Scores (avg)</td>
<td>-.0391</td>
<td>.015</td>
<td>-2.54</td>
<td>0.017</td>
<td>-.071</td>
</tr>
<tr>
<td>Limited English Proficient Students (%)</td>
<td>.132</td>
<td>.145</td>
<td>0.91</td>
<td>.369</td>
<td>-.164</td>
</tr>
<tr>
<td>Low Income Students (%)</td>
<td>-.089</td>
<td>.032</td>
<td>-2.79</td>
<td>0.009</td>
<td>-.154</td>
</tr>
<tr>
<td>Average Class Size</td>
<td>.294</td>
<td>.154</td>
<td>1.90</td>
<td>.067</td>
<td>-.022</td>
</tr>
<tr>
<td>Constant</td>
<td>20.408</td>
<td>7.935</td>
<td>2.57</td>
<td>.016</td>
<td>4.177</td>
</tr>
</tbody>
</table>

Adj. R Squared = 16.62  N = 34
Consistent with the previous data, for every one unit increase in low income students, social media use decreases by .08 units. Conversely, for every one unit increase in average class size, social media use increases by approximately .30 units and the percent of limit English proficient students increases by .13; social media also decreases slightly with every one unit increase in SAT reading scores. In this case, however, the increase in average class size and limited English Proficient may have occurred by chance and cannot be considered statistically significant at a 95% CI. Finally, only 16.6 percent of the variation in social media use can be explained by the independent variables.

In looking at the ways in which social media is used (blogging, status update, etc.), the data provides consistent findings to social media use (frequency/amount of different sites):

Table 2

<table>
<thead>
<tr>
<th>Types of Social Media Use</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT reading scores (avg)</td>
<td>-.066</td>
<td>.023</td>
<td>-2.85</td>
<td>0.008</td>
<td>-0.113</td>
</tr>
<tr>
<td>Limited English Proficient Students (%)</td>
<td>.215</td>
<td>.218</td>
<td>0.99</td>
<td>0.330</td>
<td>-.229</td>
</tr>
<tr>
<td>Low Income Students (%)</td>
<td>-.143</td>
<td>.048</td>
<td>-2.99</td>
<td>0.006</td>
<td>-.241</td>
</tr>
<tr>
<td>Average Class Size (%)</td>
<td>.489</td>
<td>.232</td>
<td>2.11</td>
<td>0.043</td>
<td>.016</td>
</tr>
<tr>
<td>Constant</td>
<td>34.558</td>
<td>11.905</td>
<td>2.90</td>
<td>0.007</td>
<td>10.209</td>
</tr>
</tbody>
</table>

Adj. R Squared = 20.69  N = 34

Across 34 observations, table 2 shows that for every one unit increase the percent of low income students, the types of social media use decreases by .14 units. Additionally the types of social media decreases with an increase in class sizes, and decreases with an increase in SAT
reading scores. The independent variables also account for approximately 21 percent of the variance in types of social media use.

Overall, these results show that there is a relationship between higher social media rates and areas of higher socio economic status. The percentage of low income students decrease with an increase in social media in both cases though the average class size increases significantly – this usually tends to be indicative of a lower socio economic school over a higher socio economic one though not always. Looking at the distribution of the variable ‘low income students,’ the standard deviation was 21.45. In this case, a one standard deviation increase in the percent of low income students is associated with a 1.9 unit decrease for ‘social media use’ and a 3.1 unit decrease for ‘types of social media use.’ Considering the fact that a school can use only one social media site, such as Facebook, and incorporate it in many different ways while still be considered categorized as a high social media integrated school, a decrease of 1.9 to 3 social media units with an increase in the percent of low income students does represent a substantive finding. Clearly, there is a statistically/substantively significant relationship between low income students and social media. It is evident that schools in higher socio economic areas are adopting social media at higher rates, but this does not tell us whether those schools are low-performing or high-performing schools.

HYPOTHESIS 2

As social media usage increases, a student’s academic performance will also increase.

The data shows very significant findings for the relationship between SAT scores and both the types of social media use as well as social media use (frequency of use) altogether. In all cases, there are findings which show the opposite of hypothesis 2, that is, social media actually
has a negative relationship with SAT scores. Table 3 shows the relationship between social media use and SAT math scores controlling for other variables. Please also note that Appendix 5 shows similar results for reading and writing scores though the numbers fluctuate slightly.

**Table 3**

| SAT Math Scores (avg) | Coefficient | Standard Error | T   | P>|t| | [95% Conf. Interval] |
|-----------------------|-------------|----------------|-----|-----|----------------------|
| Social Media Use      | -4.719      | 1.666          | -2.83 | 0.008 | -8.126 -1.312        |
| Low Income Students (%) | -1.684   | 0.247          | -6.83 | 0.000 | -2.188 -1.179        |
| Average Class Size    | 5.156       | 1.476          | 3.49  | 0.002 | 2.138 8.174          |
| Limited English Proficient Students (%) | 2.350 | 1.454 | 1.62 | 0.117 | -0.623 5.323        |
| Constant              | 486.704     | 26.419         | 18.42 | 0.000 | 432.672 540.736      |

Adj. R Squared = 66.83
N = 34

**Table 4**

| SAT Math Scores (avg) | Coefficient | Standard Error | t   | P>|t| | [95% Conf. Interval] |
|-----------------------|-------------|----------------|-----|-----|----------------------|
| Types of Social Media Use | -3.198 | 1.073          | -2.98 | 0.006 | -5.393 -1.003        |
| Low Income Students (%) | -1.687   | 0.244          | -6.93 | 0.000 | -2.185 -1.189        |
| Avg Class Size        | 5.250       | 1.463          | 3.59  | 0.001 | 2.258 8.242          |
| Limited English Proficient (%) | 2.411 | 1.439 | 1.68 | 0.105 | -0.533 5.354        |
| Constant              | 488.495     | 26.168         | 18.67 | 0.000 | 434.975 542.014      |

Adj. R Squared = 67.58
N = 34

The data shows that, for every one unit increase in social media indicators, SAT math scores decrease by 3.2-4.7 units controlling for other indicators. In looking at the standard deviations for the dependent variables, ‘social media use’ had a standard deviation of 2.8 while ‘types of social media use’ had a 4.3 standard deviation. This is significant both substantively and statistically. Substantively, this would suggest that for a one standard deviation increase in ‘social media use,’ SAT math scores decrease by 13 points. For a one standard deviation increase
in ‘types of social media use,’ SAT math scores decrease by 14 points. Many of those in
opposition of social media in the classroom have indicated that social media does have negative
effects on academic performance; it is more of a distraction than a positive and hinders the
attention span of many mentally developing, young students. This data could help to supplement
many of their concerns. However, considering the limited nature of the data, other conclusions
deserve merit.

First, it is important to realize that the SAT scores used in this model only describe one
year of averages for schools who participated in the study (34) in all. With this consideration in
mind, it could be that schools that are performing poorly are beginning to adopt social media at
higher rates than those schools who are performing highly. Theoretically, this would make sense;
a school which is already performing highly may not be a need to change or incorporate new
forms of learning if they already achieve at high rates. In exploring this second possibility, table
4 looks at social media use as a dependent variable and SAT math scores as the independent
variable to explore this possibility:

**Table 5**

<table>
<thead>
<tr>
<th>Social Media Use</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAT Math Scores</strong></td>
<td>-.046</td>
<td>.016</td>
<td>-2.83</td>
<td>0.008</td>
<td>-.079</td>
</tr>
<tr>
<td><strong>Limited English</strong></td>
<td>.207</td>
<td>.145</td>
<td>1.43</td>
<td>0.163</td>
<td>-.089</td>
</tr>
<tr>
<td><strong>Proficient Students (%)</strong></td>
<td>.105</td>
<td>.034</td>
<td>-3.09</td>
<td>0.004</td>
<td>-.175</td>
</tr>
<tr>
<td><strong>Low Income Students (%)</strong></td>
<td>.368</td>
<td>.159</td>
<td>2.30</td>
<td>0.029</td>
<td>.041</td>
</tr>
<tr>
<td><strong>Average Class Size</strong></td>
<td>23.438</td>
<td>8.207</td>
<td>2.86</td>
<td>0.008</td>
<td>6.653</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40.223</td>
</tr>
</tbody>
</table>

Adj. R Squared = 20.12  N = 34

The results from table 5 show a consistent trend to table 3 and 4 in that social media has a
negative relationship with SAT scores. This suggests that the possibility of low achieving
schools adopting social media as a means to improvement is a legitimate possibility. This is consistent with research on social media use in K-12 education as well; many schools who have adopted social media practices are low performing schools or were recently created and are striving for major improvement.

Considering that the data used in this study only encompasses one year, it would not show gains in proceeding years or how social media may help improve a school over the long term. As a result, the data shows a clear correlation between SAT scores and social media, however, in order to prove causality; it is evident that more research involving a time series panels/analysis is needed.

**HYPOTHESIS 3**

*As social media usage increases, a student’s motivation, ambition, and outlook towards higher education also increases.*

The last hypothesis explores whether social media has an influence on a student’s motivation, ambition, and outlook towards a higher education. In this case, social media variables stayed the same while I used graduation rates to represent a student’s motivation, ambition, etc. In the cases where I performed bivariate regressions between my two social media indicators and graduation rates, I found strong positive findings. Once controlled for other indicators, however, there were weak relationships between social media and graduation rates. Table 6 and 7 show the findings of the bivariate regressions; table 8 and 9 show the relationship between the types of social media use/social media use and graduation rates of 35 observations controlling for other factors:
Table 6

<table>
<thead>
<tr>
<th>Graduation Rates</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>2.792</td>
<td>1.022</td>
<td>2.73</td>
<td>0.010</td>
<td>0.713 4.870</td>
</tr>
<tr>
<td>Constant</td>
<td>75.782</td>
<td>4.393</td>
<td>17.25</td>
<td>0.000</td>
<td>66.844 84.721</td>
</tr>
</tbody>
</table>

Adj. R Squared = 15.97  N = 35

Table 7

<table>
<thead>
<tr>
<th>Graduation Rates</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Social Media Use</td>
<td>1.957</td>
<td>.645</td>
<td>3.03</td>
<td>0.005</td>
<td>.644 3.270</td>
</tr>
<tr>
<td>Constant</td>
<td>73.429</td>
<td>4.709</td>
<td>15.59</td>
<td>0.000</td>
<td>63.848 83.010</td>
</tr>
</tbody>
</table>

Adj. R Squared = 19.41  N = 35

Table 5 and 6 show strong, positive relationships between social media use/types of social media use and graduation rates. In both cases, they are also significant at a 99% CI. However, looking at the coefficients and adjusted r squared – the tables show that these statistically significant findings are not necessarily substantive – they are small changes.

Accordingly, tables 8 and 9 show the relationship between graduation rates and social media use/types of social media use.

Table 8

<table>
<thead>
<tr>
<th>Graduation rates (%)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Social Media Use</td>
<td>.969</td>
<td>.499</td>
<td>1.94</td>
<td>0.062</td>
<td>-.052 1.989</td>
</tr>
<tr>
<td>Low Income Students (%)</td>
<td>-.448</td>
<td>.114</td>
<td>-3.93</td>
<td>0.000</td>
<td>-.681 -.215</td>
</tr>
<tr>
<td>Average Class Size</td>
<td>2.065</td>
<td>.605</td>
<td>3.41</td>
<td>0.002</td>
<td>.829 3.300</td>
</tr>
<tr>
<td>Limited English Proficient (%)</td>
<td>.091</td>
<td>.673</td>
<td>0.13</td>
<td>0.894</td>
<td>-1.283 1.464</td>
</tr>
<tr>
<td>Constant</td>
<td>58.085</td>
<td>10.603</td>
<td>5.48</td>
<td>0.000</td>
<td>36.431 79.738</td>
</tr>
</tbody>
</table>

Adj. R Squared = 59.11  N = 35
### Table 9

| Graduation Rates       | Coefficient | Standard Error | t     | P>|t|  | [95% Conf. Interval] |
|------------------------|-------------|----------------|-------|---|-------------------|
| Social Media Use       | 1.249       | .782           | 1.60  | 0.121 | -.348 to 2.847    |
| Low Income Students (%)| -.456       | .116           | -3.92 | 0.000 | -.693 to -.218    |
| Average Class Size     | 2.146       | .612           | 3.51  | 0.001 | .897 to 3.395     |
| Limited English Proficient | .135       | .684           | 0.20  | 0.845 | -1.262 to 1.531   |
| Constant               | 58.463      | 10.792         | 5.42  | 0.000 | 36.424 to 80.502  |

Adj. R Squared = 58.27  N = 35

Referring to table 8 and 9, the data shows similar findings to the first bivariate regressions – for every one unit increase in social media use, increase about .97 to 1.25 units. Additionally, while its statistical significance drops; the adjusted r squared increases from the 15-20% range from tables 6 and 7 to approximately 58-60% for tables 8 and 9.

Overall, the tables do show a small, significant relationship between social media and graduation rates but it is evident that more research is needed considering the small coefficients and adjusted R squared.

### POTENTIAL FOR SOCIAL MEDIA AND K-12 EDUCATION MOVING FORTH

In introducing arguments by proponents and opponents about the role of social media in K-12 education, one point that holds true on both sides is that *social media and technology in education are here to stay*. In describing the emergence of blended learning in K-12 education nationally, Horn and Staker call social media technology a ‘disruptive innovation’, that is, “innovations which fundamentally transform a sector with much less expensive, similar, and
more convenient alternatives. In many respects, social media technology has emerged as the disruptive innovation with the capacity to transform education.

Throughout the United States, many educators have been adopting blended learning to help manage the fiscal shortfalls while maintaining quality of education, maladjusting to teacher shortages, and preparing students for the challenges of the 21st century by emphasizing heavy technology use. Blended learning can be defined as formal education programs in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part of a supervised brick-and-mortar location away from home (Appendix 6). Appendix 6 describes blended learning and its models more in depth.

In exploring the possibilities for blended learning approaches for all schools in the nation, proponents have praised schools such as Carpe Diem collegiate middle school/high school, KIPP LA, Florida Virtual School, and Rocketship education as models for success. Carpe Diem MS/HS in Arizona uses a rotation model with 55 min periods rotating from online and face-to-face instruction with both constituting one full rotation; the school usually holds 2-3 rotations a day (8-4pm) four days a week. Carpe Diem was ranked among the top 10 percent of Arizona charter schools in student performance in math and reading in 2010 and was named one of the top high schools in America by Businessweek 2009. Similarly, KIPP LA in Los Angeles is also achieving high academic success. KIPP also uses a rotation model in which students

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rotate through three stations within each subject. KIPP’s scores on the STEP Literary Assessment climbed from 9% proficient to 78% by halfway through the first year.\footnote{Ibid.}

Moreover, in response to a drastic shortages of teachers and monetary resources for public schools in Florida, Florida Virtual School helped to solve statewide teacher and budget crises quickly and strengthen district curriculum offerings through a unique structure which incorporates elements from self-blend, online lab, and flex models.\footnote{Ibid.} They also have been praised for improving completion rates and academic performance at lower costs. Finally, Rocketship education schools, which also use a rotation model, are among the top 15 for academic performance among low-income schools in California. Across its two schools, Rocketship has achieved 93% proficiency in in math and 75% in ELA while saving approximately $500,000 per school annually due to an emphasis on their learning labs.\footnote{Ibid.} Though these schools are not the only success stories, they have steadily become some of the posterchilds for blended learning in the US.

On the other hand, the results of this study, though limited, in conjunction with many schools nationally who are adopting social media technology with no substantive findings should highlight the caution educators and policymakers should take in pursuing this avenue. It is evident through blended learning and other learning approaches that social media is already being adopted in the classrooms; to what extent and for what purposes, however, remain to be seen. Until more cases of success using social media technology in K-12 classrooms become more apparent, this author recommends taking a cautious, but optimistic approach.

\footnote{Ibid.}
CONCLUSION

This paper has sought to explore an emerging phenomenon in the 21st century – social media – and its effects on public education. Increasingly, educators in K-12 and higher education have incorporated social media practices to different degrees and for different functions to support the overall progress of their institutions. In utilizing survey data submitted from 35 high school principals, the data suggests some surprising results; First, it is evident that schools in higher socio economic areas adopt social media at higher rates than schools in lower socio economic areas. Second, there were no significant findings regarding the types of schools which are using social media or how social media affects a student’s outlook, ambitions, or motivation towards higher education/graduation. Finally, the data suggests that social media has a negative relationship with SAT scores. This data was substantively and statistically significant across two indicators for social media and SAT reading, writing, and math scores. It is clear that more research, including times-series data, is needed to prove a causal relationship between the two – many schools and districts are only recently adopting social media technology into their curriculum.
## APPENDIX 1

<table>
<thead>
<tr>
<th>LEARNING/Academic</th>
<th>Student Support</th>
<th>Community Building</th>
<th>Expanding Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty communicate with and engage students in their courses</td>
<td>Provide student support</td>
<td>Build and strengthen campus community</td>
<td>Connect students with alumni</td>
</tr>
<tr>
<td>Construct links between Facebook and Blackboard so students can check class assignments and receive course announcements</td>
<td>Offer workshops on financial aid</td>
<td>Increase sense of belonging for students taking online courses</td>
<td>Conduct outreach to community</td>
</tr>
<tr>
<td>Create stronger learning communities</td>
<td>Resolve issues and allow students and the community to provide feedback to the college</td>
<td>Actively encourage and facilitate student involvement and participation in activities</td>
<td></td>
</tr>
<tr>
<td>Post portions of lectures for downloading</td>
<td>Offer orientation</td>
<td>Invite participation in campus-wide blogs (i.e., student blogs, president’s blog, blog focused on innovation in instruction)</td>
<td></td>
</tr>
<tr>
<td>Facilitate class discussion and group project work</td>
<td>Provide mentoring to students</td>
<td>Help to navigate the registration process</td>
<td></td>
</tr>
<tr>
<td>Facilitate study groups and other in-class collaboration</td>
<td>Boost about students’ academic accomplishments</td>
<td>Aid in improving student retention</td>
<td></td>
</tr>
<tr>
<td>Recruit students into specific academic programs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2a. Twitter Smart Card
APPENDIX 2b. Google+ Smart Card
APPENDIX 2c. LinkedIn Smart Card

LinkedIn Smart Card

Social Networks - Do's and Don'ts

- Only establish and maintain connections with people you know and trust. Review your connections often.
- Assume that ANYONE can see any information about your activities, personal life, or professional life that you post and share.
- Ensure that your family takes similar precautions with their accounts; their privacy and sharing settings can expose your personal data.
- Avoid posting or tagging images of you or your family that clearly show your face. Select pictures taken at a distance, at an angle, or otherwise concealed. Never post Smartphone photos and don't use your face as a profile photo, instead, use cartoons or avatars.
- Use secure browser settings when possible and monitor your browsing history to ensure that you recognize all access points.

Managing Your LinkedIn Profile

LinkedIn is a professional networking site whose users establish connections with co-workers, customers, business contacts, and potential employers and employers. Users post and share information about current and previous employment, education, military activities, specialties, and interests. To limit exposure of your personal information, you can manage who can view your profile and activities.

Profile Settings

Apply the Profile settings shown with arrows below to ensure that your information is visible only to people of your choosing.

- Set to no one
- Set to Only you
- Set to totally anonymous
- My Connections

Users tend to share information related to their careers or jobs as opposed to photographs from parties or social events.
LinkedIn profiles tend to be more visible and searchable than in social networks such as Facebook.
Paid LinkedIn accounts have access to more information about other users, such as connections, than free accounts.
The type of information users can see about each other depends on how closely they are connected (1st, 2nd, or 3rd degree).
APPENDIX 4. Survey used for Social Media Results

Social Media usage in MA Public High Schools

Q23  Hello. Thank you for taking time to visit my survey. My name is Daniel Lopez and I am a current Masters in Public Policy Candidate at Boston University. As a part of my thesis for Honors distinction, I am looking to explore the interactions between social media and education--more specifically, the public High Schools in Massachusetts. Social media can be defined as any online entity which allows its users to interact with each other via status updates, blogging, video sharing, or any other form of online interaction between users. Some popular examples of social media are Facebook, Twitter, linkedin, pinterest, and google +.  This survey entails a series of questions regarding your school's involvement, if any, in social media and more specific questions regarding the types of social media used and the groups which are utilizing it. The survey itself should take no more than 15 minutes to answer. No information will be used in the paper that could identify you or the school about which you are providing information.  I will also be sending out a copy of the paper via email to any survey respondent who requests it after it is complete in mid-late April.  For more information on the study and how these results will be used, please contact Daniel Lopez at dalopez@bu.edu.

Q24  Would you like to continue?
☐ Yes (1)
☐ No (2)

Q2 Email

Q3 School and Position/Title

Q4 What type of High School do you currently work in?
☐ Public (1)
☐ Charter (2)

Q8 How active are you in Social Media use in your personal life? (i.e. Facebook, Twitter, Linkedin, etc)
☐ Frequent (Daily use) (1)
☐ Somewhat Frequent (Weekly use) (2)
☐ Sometimes (Bi-weekly use) (3)
☐ Less Frequent (Monthly use) (4)
☐ Rarely (less than once a month) (5)
☐ None (6)
Q5 Is Social Media currently used on your campus either in the curriculum formally or informally by teachers, counselors, other administrators, etc for education purposes?
- Yes (1)
- No (2)

Q6 What types of Social Media are used? (Check all that apply)
- Facebook (1)
- Tumblr (2)
- Twitter (3)
- Blackboard (4)
- Skype (5)
- Instagram (6)
- Linkedin (7)
- Pinterest (8)
- Academia.edu (9)
- Google + (10)
- Flixster (11)
- Classmates.com (12)
- Flickr (13)
- Myspace (14)
- Teach street (15)
- Student Circle Network (16)
- Khan Academy (17)

Q9 Are there any additional sources of Social Media used not listed above? Please feel free to also describe how these additional sources are used (i.e. status updates, professional interaction, video collaboration, blogging, etc) and by who.

Q11 In what ways are these Social Media sources used? (Check all that apply)
- Blogging (1)
- File Sharing (2)
- Status Updating (3)
- Video/Multimedia collaboration (4)
- Professional/alumni/student interaction, development, or networking (5)

Q12 Are there any additional ways that your school or individuals within the use Social Media for educational/networking purposes?
Q10 Which group(s) of individuals use Social Media these purposes and how frequently do they do so? (Check all that apply)

<table>
<thead>
<tr>
<th></th>
<th>Frequent (Daily use) (1)</th>
<th>Sometimes Frequent (Weekly use) (2)</th>
<th>Sometimes (Bi-weekly use) (3)</th>
<th>Less Frequent (Monthly use) (4)</th>
<th>N/A (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers in Math and Science (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers in English and History (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers in other Electives (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Administrators (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Counselors (5)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Students in Math and Science (6)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Students in English and History (7)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Students in other Electives (8)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q13 Have there been any improvements, changes, or other effects on any of these groups or other groups since their usage of Social media? (i.e. test performance, class participation, alumni interaction, student development, etc) Please answer openly.

Q14 Are there any additional programs, social media sites, and/or technology that have been important to your campus?

Q15 Are there any specific reasons why Social media has not been used by your school? Please feel free to describe below.
## APPENDIX 5. ADDITIONAL DATA TABLES

### Social Media as the Dependent Variable

| Types of Social Media Use | Coefficient | Standard Error | t     | P>|t| | [95% Conf. Interval] |
|---------------------------|-------------|----------------|-------|-----|--------------------------|
| SAT Math Scores           | -.073       | .025           | -2.98 | 0.006 | -.124 -.023               |
| Limited English Proficient Students (%) | .334 | .220 | 1.52 | 0.139 | -.115 .783 |
| Low Income Students (%)   | -.165       | .052           | -3.19 | 0.003 | -.271 -.059               |
| Average Class Size        | .596        | .242           | 2.46  | 0.020 | .101 1.091               |
| Constant                  | 37.801      | 12.451         | 3.04  | 0.005 | 12.337 63.266            |

Adj. R Squared = 22.30  N = 34

| Types of Social Media Use | Coefficient | Standard Error | t     | P>|t| | [95% Conf. Interval] |
|---------------------------|-------------|----------------|-------|-----|--------------------------|
| SAT Writing Scores        | -.068       | .021           | -3.26 | 0.003 | -.110 -.025              |
| Limited English Proficient Students (%) | .242 | .211 | 1.15 | 0.259 | -.189 .674 |
| Low Income Students (%)   | -.152       | .046           | -3.29 | 0.003 | -.246 -.057              |
| Average Class Size        | .526        | .225           | 2.33  | 0.027 | .065  .987               |
| Constant                  | 34.527      | 10.523         | 3.28  | 0.003 | 13.006 56.049            |

Adj. R Squared = 25.73  N = 34

| Social Media Use          | Coefficient | Standard Error | t     | P>|t| | [95% Conf. Interval] |
|---------------------------|-------------|----------------|-------|-----|--------------------------|
| SAT Writing Scores        | -.042       | .014           | -3.11 | 0.004 | -.071 -.015              |
| Limited English Proficient Students (%) | .150 | .139 | 1.08 | 0.291 | -.135 .434 |
| Low Income Students (%)   | -.097       | .030           | -3.20 | 0.003 | -.159 -.035              |
| Average Class Size        | .324        | .149           | 2.18  | 0.037 | .020  .629               |
| Constant                  | 21.472      | 6.942          | 3.09  | 0.004 | 7.275 35.669             |

Adj. R Squared = 23.52  N = 34
Social Media as the independent variable

<table>
<thead>
<tr>
<th>SAT Reading Scores (avg)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>-4.659</td>
<td>1.832</td>
<td>-2.54</td>
<td>0.017</td>
<td>-8.405 to -0.913</td>
</tr>
<tr>
<td>Low Income Students (%)</td>
<td>-1.525</td>
<td>0.271</td>
<td>-5.63</td>
<td>0.000</td>
<td>-2.079 to -0.9708</td>
</tr>
<tr>
<td>Avg Class Size</td>
<td>4.020</td>
<td>1.622</td>
<td>2.48</td>
<td>0.019</td>
<td>0.702 to 7.338</td>
</tr>
<tr>
<td>Limited English Proficient Students (%)</td>
<td>.739</td>
<td>1.598</td>
<td>0.46</td>
<td>0.647</td>
<td>-2.529 to 4.009</td>
</tr>
<tr>
<td>Constant</td>
<td>492.332</td>
<td>29.048</td>
<td>16.95</td>
<td>0.000</td>
<td>432.922 to 551.742</td>
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</tbody>
</table>

*Adj. R Squared = 58.95  N = 34*

<table>
<thead>
<tr>
<th>SAT Reading Scores (avg)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Social Media Use</td>
<td>-3.323</td>
<td>1.167</td>
<td>-2.85</td>
<td>0.008</td>
<td>-5.709 to -0.937</td>
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<tr>
<td>Low Income Students (%)</td>
<td>-1.538</td>
<td>0.265</td>
<td>-5.81</td>
<td>0.000</td>
<td>-2.079 to -0.996</td>
</tr>
<tr>
<td>Avg Class Size</td>
<td>4.159</td>
<td>1.591</td>
<td>2.61</td>
<td>0.014</td>
<td>.906 to 7.412</td>
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<tr>
<td>Limited English Proficient Students (%)</td>
<td>.833</td>
<td>1.565</td>
<td>0.53</td>
<td>0.598</td>
<td>-2.367 to 4.034</td>
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<tr>
<td>Constant</td>
<td>494.531</td>
<td>28.452</td>
<td>17.38</td>
<td>0.000</td>
<td>436.340 to 552.723</td>
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</tbody>
</table>

*Adj. R Squared = 60.76  N = 34*

<table>
<thead>
<tr>
<th>SAT Writing Scores (avg)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>-5.854</td>
<td>1.883</td>
<td>-3.11</td>
<td>0.004</td>
<td>-9.705 to -2.004</td>
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<tr>
<td>Low Income Students (%)</td>
<td>-1.649</td>
<td>.2787</td>
<td>-5.92</td>
<td>0.000</td>
<td>-2.219 to -1.079</td>
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<tr>
<td>Avg Class Size</td>
<td>4.661</td>
<td>1.668</td>
<td>2.80</td>
<td>0.009</td>
<td>1.250 to 8.072</td>
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<td>Limited English Proficient Students (%)</td>
<td>1.285</td>
<td>1.643</td>
<td>0.78</td>
<td>0.440</td>
<td>-2.075 to 4.646</td>
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<td>Constant</td>
<td>478.414</td>
<td>29.857</td>
<td>16.02</td>
<td>0.000</td>
<td>417.348 to 539.480</td>
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</table>

*Adj. R Squared = 61.63  N = 34*

<table>
<thead>
<tr>
<th>SAT Writing Scores (avg)</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Social Media Use</td>
<td>-3.951</td>
<td>1.212</td>
<td>-3.26</td>
<td>0.003</td>
<td>-6.429 to -1.472</td>
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<tr>
<td>Low Income Students (%)</td>
<td>-1.652</td>
<td>.275</td>
<td>-6.01</td>
<td>0.000</td>
<td>-2.215 to -1.089</td>
</tr>
<tr>
<td>Average Class Size</td>
<td>4.773</td>
<td>1.652</td>
<td>2.89</td>
<td>0.007</td>
<td>1.395 to 8.152</td>
</tr>
<tr>
<td>Limited English Proficient (%)</td>
<td>1.3568</td>
<td>1.625</td>
<td>0.83</td>
<td>0.411</td>
<td>-1.967 to 4.681</td>
</tr>
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<td>Constant</td>
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<td>29.550</td>
<td>16.26</td>
<td>0.000</td>
<td>420.154 to 541.029</td>
</tr>
</tbody>
</table>

*Adj. R Squared = 62.30  N = 34*
APPENDIX 6. MODELS OF BLENDED LEARNING

**Figure 2.** Definition of blended learning

Blended learning is...

- A formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace

and

- At least in part at a supervised brick-and-mortar location away from home.

**Figure 1.** Blended-learning taxonomy

1. **Rotation model**
   - Station-Rotation model
   - Lab-Rotation model
   - Flipped-Classroom model
   - Individual-Rotation model

2. **Flex model**
3. **Self-Blend model**
4. **Enriched-Virtual model**
EXAMPLES OF BLENDED LEARNING MODELS

Rotation Models:

- **Figure 6.** Station-Rotation model, KIPP LA Empower Academy
- **Figure 7.** Lab-Rotation model, Rocketship Education
- **Figure 8.** Flipped-Classroom model, Stillwater Area Public Schools
- **Figure 9.** Individual-Rotation model, Corpo Diem Collegiate High School and Middle School
Flex Model, Self-Blend, and Enriched-Virtual Models:
BIBLIOGRAPHY


