Urban Parents at the Portal: Family Use of Web-Based Information on Ninth Grade Student Course Grades

Martha Abele Mac Iver
Johns Hopkins University

Kellie Wills
University of Washington

Steven Sheldon
Emily Clark
Douglas J. Mac Iver
Johns Hopkins University

Forthcoming in *School Community Journal*, Spring/Summer 2021

This research was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305H150081 to the Johns Hopkins University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Abstract

Improving ninth grade course passing rates has been shown to be crucial in improving high school outcomes. Yet at this critical transition to high school, family engagement has tended to decrease. This study explores how increasing use of the parent portal could potentially help to reduce ninth grade failure. Using automatically-generated longitudinal portal access data from one large urban district, this study investigates the relationship between family use of the parent portal and the odds of students' course failure during ninth grade. Hierarchical linear model analyses showed a significant negative relationship between parent portal use and semester course failure, controlling for prior failing report card grades during the year and demographic variables associated with course failure. Although causal conclusions cannot be drawn from this study, the evidence supports and extends previous experimental studies of portal use. This suggests that efforts to expand parent portal use may potentially contribute to reducing students' course failure through increased monitoring and intervention efforts prior to the end of the semester.

Urban Parents at the Portal: Family Use of Web-Based Information on Student Course Grades

Family engagement, particularly "supporting parents to support learning," is one of the essential elements for improving urban schools (Bryk et al., 2010, p. 57). Building on Bronfenbrenner's ecological systems theory, Epstein (1987) identified the importance of ensuring that schools actively organize the "overlapping spheres of influence" of home, school, and community that influence student success in school. She argued that school and teacher philosophies, histories, and practices to reach out to families are among the mechanisms that bring school and home contexts more closely aligned. Likewise, family philosophies, histories, and practices also influence the degree to which the three spheres overlap one another. This framework involves a more systematic approach to building school-family-community partnerships than the "random acts of family engagement" (Weiss, Lopez, & Rosenberg, 2010) that are currently prevalent in many schools. Building the capacity of both educators and families to partner together effectively to improve student outcomes has become a national educational priority (Mapp & Kuttner, 2013; Walsh, 2014).

Compared to elementary schools, secondary schools across the country particularly struggle in addressing challenges to effectively engage families in their children's education (Epstein et al., 2019; Hoover-Dempsey, Ice, & Whitaker, 2009). Research shows that family involvement declines precipitously during students' transition to high school (e.g., Spera, 2005). High schools place less priority on engaging families at the developmental stage when students want to declare more independence (e.g., Simon, 2004). Some studies have identified ways that high school policies and practices push away parents who seek to engage in support of their

children's academic progress (Wallace, 2013; Williams & Sánchez, 2012). Schools serving poor and minority students enact practices that tend to restrict parental access to important educational information or even physical access to the school, crucial channels for family engagement in their children's education (Williams & Sanchez, 2011).

At the same time, research indicates that parents play important roles during adolescence and respond when schools take initiative and reach out to them (e.g., Chao & Hill, 2009; Epstein, 2011; Green et al., 2007; Hoover-Dempsey et al., 2009; Jeynes, 2007). High school students report that family members influence them the most when making educational and career decisions (U.S. Department of Education, 2018). Simon (2004) found that various forms of high school outreach to students' families were associated with higher levels of family educational support to students. In particular, Simon (2004, pp. 200-201) asserted: "According to parents, the more often school staff contacted them about how to help their teenagers with homework, the more frequently parents worked with their teenagers on homework or school projects, regardless of student background or achievement." Park and Holloway (2018) identified the school's level of welcoming environment and informative communication as important factors associated with parental involvement in adolescents' schools.

Good two-way communication between families and schools, in which families feel free to voice their questions and concerns and know they will receive positive and useful responses as well as important information, is the foundation that can advance student outcomes (Conus & Fahrni, 2019; Weiss, Lopez, & Caspe, 2018). Communication between home and school has been dramatically influenced over the past couple of decades by developments in technology (Aldunate & Nussbaum, 2013; Patrikakou, 2016; Zieger & Tan, 2012). Email and text messaging have largely replaced traditional phone communications, though some schools

continue to use automated phone messaging (Olmstead, 2013; Thompson, Mazer, & Flood Grady, 2015). Experimental studies have shown that low-cost interventions using mailings and text messaging to facilitate communication with families about student progress can yield significant improvements in student attendance and course performance (Bennett-Conroy, 2012: Bergman & Chan, 2019; Kraft & Rogers, 2015; Robinson, Lee, Dearing, & Rogers, 2018; Rogers et al., 2017; Rogers & Feller, 2018).

Even more passive forms of communication, such as web-based parent portals (linked to digital teacher gradebook technology and/or learning management systems) that allow families to monitor their students' grades throughout the year, have the potential to help increase the kinds of school to family communications and family support that can make a difference between students passing and failing their high school courses (Altman & Meis, 2013; Miller, Brady, & Izumi, 2016; Weiss, Lopez, & Stark, 2011). Studies using survey and interview data from both school staff and family members about parent portals have identified parents' perceptions of improved communications with teachers and with their children (Dries, 2014; Shayne, 2008; Starkie, 2012), and educators' perceptions of improved parental involvement and student outcomes (Johnson, 2013).

At the same time, access to this new technology is unevenly distributed across families of different socioeconomic status (e.g., Levine, 2018; Mubarek, Suomi, & Kantola, 2019), and use of this technology for home-school communication often widens the digital divide between the classes (e.g., Mac Iver, Sheldon, & Clark, 2021; Hollingworth, Mansaray, Allen, & Rose, 2011; NEA, 2011). Survey findings from Pew Research (2019) indicate that less than three in four (73%) adult individuals in the U.S. had access to broadband (high-speed) internet connection at home in 2019. For families with incomes below $30,000, this figure is 56%. Probably because

of the intersection of class and racial divides, rates of broadband access are lower for Blacks (66%) and Hispanics (61%) than Whites (79%). Pew Research (2019) also found that about a quarter of low-income individuals and a quarter of Blacks do not have broadband at home but own smartphones, which is their source of internet connection. This digital divide represents one more dimension of the continued impact of socioeconomic status on educational outcomes.

Besides this issue of the digital divide, studies have identified specific challenges associated with the use of parent portals, including parents' frustration about the timeliness of student course grades on the portal (Laho, 2019; Miller et al., 2016), insufficient support to parents by the school for portal use (Johnson, 2013), the one-way nature of the portal communication (Selwyn, Banaji, Hadjithoma-Garstka, & Clark, 2011), and lack of time to check the portal on a regular basis (Koch, 2010). Research has also found teacher frustration about counterproductive communications from parents (Kokoszka, 2009), technical issues associated with learning platforms (Laho, 2019), insufficient professional development about using the portal (Laho, 2019), and lack of technology skills among some families that teachers believe reduces or prevents parents' use of the portal (del Valle, 2011). While some might respond to these challenges by giving less attention to the parent portal as a viable family engagement tool and seeking to place more emphasis on alternative strategies, these findings indicate areas in which schools can pursue continuous improvement in making the portal a more effective tool.

Research based on individual level parent portal login data is only just emerging, but there are hopeful signs about the potential for the portal to make a positive difference in student outcomes. Bergman (2016, 2019) has conducted the most extensive work using parent portal login data, documenting differences in portal use by ethnicity and income status. He reported increased use of the portal at schools where information was updated more frequently. His

experimental studies show a small positive impact of short communications to families (nudges) on frequency of parent login to a portal, as well as a significant positive effect of the nudge to increase portal use on student grades. Although Bergman's experimental study sample of 59 schools from three districts included elementary, middle, and high schools, his analysis of the nudge intervention effect on student grade point average did not differentiate by school level. Building on the foundation of this emerging work, this study aims to add to the literature on the relationship between parental use of school-based portals and high school student outcomes.

The Importance of the Ninth Grade Course Performance Outcome

Ninth grade course passing is a particularly important student outcome on which to focus. Multiple studies over the past couple of decades have demonstrated the extent to which ninth grade outcomes, particularly course passing, predict high school graduation outcomes and postsecondary success (Allensworth, 2013; Mac Iver & Messel, 2013; Neild, Stoner-Eby, & Furstenberg, 2008). Because students must receive passing grades in courses to earn the credits needed for graduation, the ninth-grade course passing rate is not surprisingly a primary leading indicator of high school graduation rates. Building on studies that demonstrated the effectiveness of close monitoring and intervention on such student outcomes (e.g., Sinclair, Christenson, & Thurlow, 2005), researchers have developed and rigorously studied the impact of early warning indicator and intervention systems on ninth grade attendance, behavior, and course passing outcomes (e.g., Mac Iver et al., 2019; Corrin et al., 2016; Faria et al., 2017). Although some of these studies have demonstrated positive results on these ninth-grade outcomes, the variation in implementation of specific intervention practices likely helps to explain variation in findings across the studies.

In response to research findings about the importance of ninth grade indicators and the potential for improving them, schools and districts have begun monitoring these indicators more closely. In some districts this has led to improvements in ninth grade outcome indicators over time (e.g., Allensworth, 2013). By 2014-15, more than half (52%) of public high schools responding to a nationally representative survey claimed to have implemented an early warning system (U.S. Department of Education, 2016). At the same time, though, fewer than half of those schools with early warning systems reported close coordination between their system and the other strategies and services implemented within the high school (U.S. Department of Education, 2016). Ensuring that appropriate interventions occur as students show early warning signs of struggling is critical to improving student outcomes, particularly during the critical first year of high school. One important ally in monitoring ninth grade student performance to which researchers and educational practitioners have tended to pay insufficient attention is the families of those students.

This study sought to investigate variation in how ninth grade families were using the parent portal tool and the extent to which their use of the portal was related to important student outcomes. Recognizing the severity of equity issues in parental and community involvement in schools emphasized by Baquedano-Lopez, Alexander, and Hernandez (2013), and the tendency for our ecological theoretical approach to become overly school-centric (Warren, Hong, Rubin, & Uy, 2009), we apply a critical lens to the "overlapping spheres of influence" theory to examine ways in which schools need to improve in their communications with families, particularly those that have been historically marginalized and underserved. If the use of parent portals is shown to potentially influence student outcomes, our findings will have ramifications for how school practices in communicating with families can become more equitable.

Study Background

We conducted this study on parent portal usage under a broader continuous improvement initiative undertaken by an education research-practice partnership comprised of leaders in an urban district and a group of university-affiliated researchers (Mac Iver et al., 2018). The four-year initiative focused on improving schools' family engagement efforts during the transition to high school as one lever for improving ninth-grade student course passing and credit accrual. The initiative included workshops for the district's middle and high school staff each year and additional professional development and coaching for school staff to equip them to increase and improve their family engagement efforts during the critical transition to high school. Among other two-way communication strategies, communication aimed at increasing access to and use of the parent portal was one of the family engagement strategies encouraged during the initiative.

The partner district in this study was located in a large western city. More than half (53%) of the district's approximately 53,000 students are non-White, and about three in ten are eligible for free or reduced-price lunch. About one in five students have a home language other than English. Among ninth grade students, about one in five has at least one failing semester course grade (and needs credit recovery for the .5 credit that was not earned). The district advertises its parent portal on its website, with links to help families view the types of information it includes (i.e., attendance, assessment scores, and course assignment grades for secondary students) and how to access the portal and use it.

Study Research Questions and Methodology

Given the importance of ninth grade as a "make or break year" for high school success (Consortium on Chicago School Research, 2007), this study focuses primarily on ninth-grade families. It addresses the following research questions:

1. How does the frequency of accessing the parent portal vary by timepoints (weekday vs. weekend, month during the year)?
2. How has the percentage of ninth grade parents accessing the parent portal changed over a five-year period (2014-15 through 2018-19)?
3. How does frequency of a parent/guardian accessing the portal (ever vs. never during the year; number of logins) vary by student demographic characteristics and school characteristics for students in grade 9?
4. To what extent does a parent/guardian logging in to the portal predict the odds of ninth-grade student course failure, controlling for a previous failing report card grade during the same year as well as other student and school characteristics?

The study focuses primarily on the final research question, which addresses the key relationship posited between student academic outcomes and the kind of parental support (over and beyond support from teachers) that can be influenced by information from the parent portal. The first two research questions are primarily descriptive. Addressing them will provide contextual background about timing of parental use of the portal and how usage may have increased over time, particularly during the context of the four-year family engagement intervention described above. The third research question addresses issues related to equity and the "digital divide" discussed above, as lower rates of usage may be related to socio-economic factors associated with more limited access to internet technology.

Data

The district provided electronically collected data on each parent/guardian login to the parent portal for each of five years (2014-15 through 2018-19; the period of the family engagement initiative, including the year prior to its commencement). The files allowed for

parent portal data to be linked to administrative data on student demographic characteristics and course performance. We created analytical datasets that included data on all students in grade 9 for each year during the five-year period. On average, each year of data included approximately 3600 students, nested in 11 high schools. Alternative schools (serving students with records of particular struggles in the past, or schools with alternative grading systems for which outcome data were not available) were excluded from analyses. The schools ranged in total enrollment from about 275 to 1725, with a median of 1170. The primary analytical file from 2018-19 included all 3544 grade 9 students with course grade data, merged with records of parent login to the portal. The size of grade 9 classes ranged from 70 to 554 across the 11 schools (median 301).

Student Level Variables

Parent portal usage. Besides the count of number of parental logins to the portal over the academic year, we constructed dichotomous variables for students in each cohort year for whether or not the parent logged in at least once during: 1) the entire academic year, 2) first semester, 3) second semester, 4) both first and second semesters, 5) all four quarters of the year. When there was no record of parent login to the portal for a student in any particular year, the count of logins was coded as zero.

Ninth grade course performance. Student course grades were recoded into a series of dichotomous variables: had a failing grade during Quarter 1, had a failing grade for Semester 1, had a failing grade for Semester 2. Data were analyzed by semester because credit accrual in this district was counted by semester. If students did not earn the .5 credit for the semester in the course, they had to recover the credit by some means, and so the semester credit was a

meaningful outcome variable. Conducting the second semester analysis was also a way of determining whether the relationships were replicable over time.

Student demographic and status variables. Student level demographic variables included dichotomous variables for gender, ethnicity group (White, Black, Asian, Hispanic, other non-White), receipt of special education services, and having a home language other than English. Because attendance is so highly correlated with course performance and other covariates, it was not included in our models.

School Level Variables

Proportion of students eligible for free and reduced-price meals. School level data were provided by the district (as individual level data for this indicator could not be shared with external researchers).

Analytic Methods

Analyses for the first two research questions involved descriptive analyses of parent login data summarized in tables and graphs. Analyses for the remaining questions employed hierarchical logistic regression (with individual student level data linked to parent portal login data and nested within the eleven high schools).[1] The hierarchical logistic regression analyses controlled for the student level variables listed above (using particular failure variables as appropriate to the particular analysis). In addition, analyses of login frequency involved negative binomial regression with school fixed effects for login count data. Our use of negative binomial regression takes into account the fact that the count of logins to the portal are not

[1] Austin (2010) and Hoyle and Gottfredson (2015) argue that multilevel modeling can be reliably conducted with at least 10 level 2 units. Although the empirical size of the intraclass correlation coefficient (ICC) was relatively low in the conducted models, this did not require the use of the simpler OLS model, given theoretical reasons for expecting variation in login rates and failure rates between schools (Raykov, 2011).

distributed normally but rather follow a skewed Poisson distribution which is overdispersed – that is, the variance is larger than the mean (Gardner, Mulvey, & Shaw, 1995). Given the distribution of login counts and interpretation issues, it was more appropriate to use the dichotomous measure of portal login when using it as an independent variable in models predicting student course failure.

Findings

Extent and Frequency of Portal Access

Figure 1 shows the total number of parent logins (for all parents of grade 9 students) by date for the 2018-19 school year. More logins occurred on weekdays, perhaps indicating parents' attention to this information on school days, or access from computers at work. "Spikes" of increased use occurred near key academic dates, including the end of first quarter, the end of first semester, the end of third quarter, and the last day of school. Login volume decreased over the school year.

Figure 2 summarizes change in ninth grade parent login activity over the five-year period. It shows a relatively stable pattern of "ever logging in" to the portal until 2017-18, when there was a notable increase in the percentage of families with at least one record of accessing the portal (from about 45% to 54%) that continued the following year (to 59% of families overall in 2018-19). This increase coincided with the partnership efforts to increase schools' family engagement activities during the transition to high school (Mac Iver et al., 2018), but it cannot be causally attributed to that intervention. Other factors occurring within the district and its high schools over this time period, including a growing emphasis on ninth grade credit accumulation, could have contributed to this increase.

Figure 3 shows portal login activity for particular periods during the 2018-19 school year. A larger proportion of families logged in to the portal during the first semester (56.6%) than during the second semester (47.0%). Slightly fewer than that (44.2%) logged in at least once in each semester, and fewer than one in three families (31.3%) logged in at least once during each quarter. A similar pattern (with somewhat lower rates of login activity) occurred during the prior four years.

Factors that Predict Portal Usage

Analyses showed wide variation between ethnicity groups in portal login activity. Figure 4 summarizes these patterns over the five-year period, indicating how gaps in portal usage by ethnicity remain wide in this district. The growth in parent portal usage over the five-year period occurred to the largest extent among White families (from an average of about 67% in 2014-17 to nearly 82% in 2018-19) and Asian families (from about 26% in 2014-15 to 39% in 2018-19). Non-White families continue to log into the portal at substantially lower rates than White families (with just 31% of Hispanic families and 25% of Black families logging in at least once in 2018-19). Although we could not explore socio-economic factors with the data available, other research suggests these ethnicity gaps are related to some degree to socio-economic factors even if not fully explained by them (American Psychological Association, Task Force on Socioeconomic Status, 2007; Lee, 2002).

To further investigate factors associated with parent portal usage, we performed hierarchical logistic regression (students linked to parent portal data, nested within schools) on the probability that a ninth-grade student's parent/guardian logged in during the 2018-19 school year (both first semester and during the entire year). Table 1 presents coefficient estimates for the relationship of student and school characteristics to the dichotomous parent login outcome from

a model controlling all variables simultaneously. Parents or guardians of non-White students, special education students, and those with home languages other than English were significantly less likely to log in to the portal during the first semester and during the entire year than the reference group (English-speaking parents of White students in regular education). In particular, the odds ratios[2] for having a parent login at least once during the year were: .54 for Asian students, .33 for Hispanic students, .23 for Black students, .47 for other non-White students, .53 for special education students, .20 for students with a home language other than English. Parents/guardians of students from schools with a higher percentage of students eligible for free/reduced-price lunch also had a lower probability of logging into the portal, over and above the other student characteristics. School-level portal login rates varied considerably, with much of that variation explained by the variation across schools in percentage of students from low-income families. At the same time, other unmeasured factors (including potentially the extent of school-to family communication about the portal) accounted for some of the variation in school-level portal login rates. Although the intra-class correlation coefficients for these models were quite small after controlling (at the student level) for the percentage of students eligible for free/reduced price lunch at the school, the hierarchical models were still the best way to estimate standard errors.

In addition, we also conducted negative binomial regression analyses with school fixed effects to investigate the association of student characteristics with login frequency (count of logins) among parents/guardians who logged in during Semester 1 of 2018-19 (Table 2). Parent/guardian IDs associated with a male student logged in 26% more often on average than

[2] The smaller the odds ratio in relation to 1.0, the lower the probability of logging in, compared to the reference group.

did parents of female students during first semester. Logins increased 7% on average for each additional child in the district. (Available data did not include the gender of other children in the family.)

The Relationship between Parent Portal Use and Course Failure

Analyses sought to investigate whether parent portal use was associated with lower rates of student failure, controlling for prior failing grades. Table 3 provides a descriptive picture of the bivariate relationship between portal use and student course failure. Among ninth grade students who had received at least one failing grade during Quarter 1 in 2018-19, parent/guardian portal login during Semester 1 was associated with a lower rate of failing a course for the semester (47%, compared to a failure rate of 58% among students whose parent/guardian did not login to the portal at all during Semester 1).

To examine the statistical significance and size of the relationship between portal login and student failure controlling for other factors associated with portal login, we performed hierarchical logistic regression (students linked to parent portal data, nested within schools) on the probability that a ninth-grade student failed at least one course in 2018-19. Table 4 presents coefficient estimates for the dichotomous parent/guardian login measure and other student characteristics simultaneously controlled in the full model. Parent/guardian login was associated with a significantly lower risk of Semester 1 failure, even when controlling for Quarter 1 failure and other student factors related to parent portal use. Controlling for other factors, ninth-grade students whose parents/guardians logged into the portal at least once had about a 50% decrease in the odds of failing a course during first semester. Table 5 demonstrates similar findings predicting a Semester 2 failure, controlling for a failing grade in first semester and other student level covariates.

Discussion

This study is one of only a small number of studies to analyze individual family behavior in accessing an online parent portal that provides dynamic information about students' course grades. Overall usage of the parent portal among ninth grade parents was relatively low, particularly for historically underserved non-White families and those families whose home language was not English. Analyses also showed evidence that family portal use was associated with a lower likelihood of ninth grade course failure.

The associations we report between family demographic variables and portal access frequency confirm concerns raised by others (e.g., Miller et al., 2016) about the equity of access for non-White families and those with home languages other than English. Parents' lower portal access rates may be due to a number of factors, including lack of internet service or home computing devices related to lower socio-economic status, as well as lack of information about the portal and how to access it.

Findings from another study in the focal district indicated that many immigrant families had no idea about the portal as a resource until they were invited to targeted meetings to see a demonstration and get help in logging into the portal system (Mac Iver et al., 2021). That study identified many barriers to families in the process of obtaining login access to the system, including problems with setting up an email address for the first time, having multiple email addresses in the system that required a single address, and difficulty in following the online directions for accessing the system. Once families were provided information to understand the value of the portal and help in gaining access, they were enthusiastic about using the tool to monitor their children's progress and were able to access the system and view student grades on their smartphones.

Findings about the timing of logins to the parent portal may have implications for school communications to families. The dramatic increase in logins near the end of the semester suggests that families may be receiving messaging from schools at that time about semester exams and end of semester grades. As school leaders examine course failure rates and why many students were not able to turn around poor performance in time to pass their courses, they may want to consider how earlier messaging to families about using the portal to monitor assignments and class grades could potentially help to reduce course failure rates.

In the current study, analyses showed a significant relationship between a parent/guardian logging into the portal and a reduced probability of students' course failure at the end of the semester, controlling for other factors (gender, ethnicity, special education status, English language learner status, and prior failure) associated with both parent portal usage rates and failure. In a subsample of students who had a failing Quarter 1 grade, analyses also demonstrated a lower rate of semester course failure (and greater likelihood of earning the half-credit needed to stay on track to high school graduation) among students whose parents had logged into the portal that semester. Although these analyses controlling for prior failure suggest the potential for parent portal use to reduce student course failure, the study design does not allow for rigorous causal conclusions about the role of parent monitoring through the parent portal. It is possible that other factors besides portal usage are the actual causes of students' lower levels of course failure. Nevertheless, the findings reported here align with the causal evidence from other districts reported by Bergman (2016, 2019) and suggest that there is a possibility that increasing parent/guardian use of the portal could help to reduce students' course failures.

One can posit a plausible theory of change suggesting that increased parental information about low grades or missing assignments could lead to parental encouragement for their children to spend more time on homework and submitting assignments, and on studying for tests (Simon, 2004; Spera, 2005). Use of the portal could also foster helpful conversations between parents and teens that would help communicate the high expectations and support that encourages student academic effort (Jeynes, 2007). Testing this theory in future (not only experimental) studies designed to increase parent portal usage is certainly warranted.

The large gaps in rates of parent portal usage between White families and families of color noted in this study are almost certainly related to family income levels that could not be measured (as free/reduced price lunch status was not available to be analyzed at the student level). They may also be related to immigration status and families' familiarity with the American educational system. It is critical for schools to consider how they can increase the number of immigrant and economically disadvantaged families who are able to log in to the portal and use it regularly. This may significantly improve students' accumulation of required credits, particularly for lower-income students. Interventions designed to help families navigate the process of gaining login access to the parent portal, as well as encouragement and suggestions about how to use the portal to monitor student coursework progress and provide helpful support to students based on the information in the portal, could potentially make a difference in student outcomes, as Bergman (2016) has reported. Ensuring that information on the portal is updated in a timely way so that it can be useful feedback to students and families is an important component of schools' communication with families.

This is not to say that schools should de-emphasize their own responsibility to guide students in using the portal to monitor their grades and progress themselves. It is also essential

that schools maintain effective organizational routines for monitoring student grades in a timely way in order to alert students and families about potentially failing grades (Heppen & Therriault, 2008; Neild, Balfanz, & Herzog, 2007). Schools should also be seeking to provide interventions in time for students to turn around their performance to earn the passing grades needed to stay on-track in credit accumulation for graduation (e.g., Farrington, 2014). It is particularly essential for schools to maintain these systems, given the inequitable distribution of internet access among students' families (Hollingworth et al., 2011).

We also recognize that many family engagement scholars and practitioners may view this emphasis on equipping parents to use a district resource to monitor their children's grades and academic progress as overly school-centric, perpetuating the agendas of the school rather than empowering parents to advocate for their children's interests and broader educational justice issues (e.g., Baquedano-Lopez et al., 2013; Warren et al., 2009). There are certainly broader equity issues that districts and schools need to address beyond attention to widening the use of the parent portal. In particular, it is essential for district and school leaders to examine teacher grading practices and whether there are more systemic explanations for observed course performance gaps between dominant and non-dominant groups (Quinn, 2020). District and school leaders also need to critically examine the curriculum and instructional practices that may lead students from historically marginalized groups to disengage and not succeed academically (National Research Council, 2004).

At the same time, findings from this study and others (Mac Iver et al., 2021; Bergman, 2016, 2019) suggest that efforts by schools to inform families about the portal, support their understanding in how the use the portal, and remind them to use it could potentially make a definite difference if they successfully increase the number of families who access the portal and

effectively monitor their ninth grader's course performance. Expanding research on parent portal use, and particularly on efforts to increase such use, could contribute significantly to improving high school student outcomes. As this research expands, it would be useful to create networked learning communities to share findings and accelerate learning (Bryk et al., 2015) about the most effective ways to increase portal use and how such efforts are linked to improvements in on-time high school credit accrual, and ultimately to students' postsecondary success.

Limitations

It is important to note the limitations of this study. Its generalizability is limited because it was conducted in a single district, and focused only on ninth grade students. It will be important to replicate the study in other districts and for a larger grade span of students.

Data on logins to the portal system were available only for the parent login credentials, not for the separate student credentials. As students could access the portal themselves through a different login access, it is possible that families may have used the student login credentials to access the system. This is a much more likely limitation than the possibility that students used parent login credentials, as in many districts the student portal account is set up automatically but there are a number of steps needed to create a parent portal account (e.g., Baltimore City Public Schools, 2020). Bergman (2019) also found considerably higher rates of portal use on student accounts than parent accounts. Analysis results that also included these types of parent logins could have been different than those we conducted using only the logins related to the parent access credentials. It is also possible that the parent login data we could link to ninth grade student records were associated with portal use for other children in the family who were not in ninth grade. There was no way to distinguish which of all the family's children a parent was monitoring during portal use.

Data on family socioeconomic status – an important factor associated with both portal use and student outcomes – was not available for analysis by researchers external to the school district. Results may have differed if we had been able to include that factor as a covariate in analyses.

Causal conclusions cannot be drawn from the analyses of the association between parent portal use and lowered probability of course failure, despite the other variables controlled in our analyses. Additional experimental studies, like those of Bergman (2016, 2019) are needed before portal use can be used as a causal agent in helping to prevent student course failure.

Conclusions

This study contributes to family engagement research and practice by focusing attention on the importance of leveraging existing technologies as a resource for family engagement in high school. Most districts have made significant investments in portal technology as a means of communicating information to parents. This information is specifically about student learning, course performance, and progress. Schools have the capability of communicating with parents who are not able to attend events at school that take place only at certain times. Because of its linkage to teacher gradebooks, the portal is already part of schools' organizational routines and does not involve the additional teacher commitment and actions required by texting interventions. While more personalized texting or nudge letter communications about student course performance may be more effective, there are barriers to implementation for these interventions that are not the case for parent portal technology that is already in place. Universal "nudges" to remind parents about the portal and how to access it are much easier to implement than personalized reporting. School efforts to help more families use the portal in ways that can lead to improved student performance will also require ensuring that teachers update gradebooks

frequently enough to make portal information sufficiently useful to families. Although schools cannot rely entirely on portal technology because of the continued digital divide that prevents many families from accessing this technology, helping more families to leverage the existing technology should be a key priority.

References

Aldunate, R., & Nussbaum, M. (2013). Teacher adoption of technology. *Computers in Human Behavior, 29*(3), 519–524. doi:10.1016/j.chb.2012.10.017

Allensworth, E. (2013). The use of ninth grade early warning indicators to improve Chicago schools. *Journal of Education for Students Placed at Risk,* 18, 68-83. doi: 10.1080/10824669.2013.745181

Altman, M., & Meis, A. (2013). Kinvolved: Utilizing technology to communicate, evaluate, and advocate for improved attendance and family and community engagement. *Journal of Educational Technology Systems, 41,* 319-332.

American Psychological Association, Task Force on Socioeconomic Status. (2007). *Report of the APA Task Force on Socioeconomic Status*. Washington, DC: American Psychological Association.

Austin, P.C. (2010). Estimating multilevel logistic regression models when the number of clusters is low: A comparison of different statistical software procedures. *International Journal of Biostatistics, 6*, 1–18. doi: 10.2202/1557-4679.1195.

Baltimore City Public Schools. (2020). *Campus portal*. Retrieved from https://www.baltimorecityschools.org/campus-portal

Baquedano-López, P., Alexander, R. A., & Hernández, S. J. (2013). Equity issues in parental and community involvement in schools: What teacher educators need to know. *Review of Research in Education, 37*(1), 149-182.

Bennett-Conroy, W. (2012). Engaging parents of eighth grade students in parent-teacher bidirectional communication. *School Community Journal*, 22, 87-110.

Bergman, P. (2016). Technology adoption in education: Usage, spillovers and student achievement (CESifo No. 6101). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2866866

Bergman, P. (2019). Nudging technology use: Descriptive and experimental evidence from school information systems. *Education Finance and Policy*. Advance online publication. https://doi. org/10.1162/edfp_a_00291

Bergman, P., & Chan, E. (2019). *Leveraging parents through low-cost technology: The impact of high-frequency information on student achievement.* New York, NY: Teachers College, Columbia University. Retrieved from http://www.columbia.edu/~psb2101/ParentRCT.pdf

.

Bryk, A.S., Sebring, P.B., Allensworth, E., Luppescu, S., & Easton, J. (2010). *Organizing schools for improvement: Lessons from Chicago*. Chicago, IL: University of Chicago Press.

Bryk, A. S., Gomez, L., Grunow, A., & LeMahieu, P. (2015). *Learning to improve: How America's schools can get better at getting better.* Cambridge, MA: Harvard Education Press.

Chao, R., & Hill, N. (2009). Recommendations for developmentally appropriate strategies for parental involvement during adolescence. In N. Hill & R. Chao, (Eds.), *Families, schools, and the adolescent: Connecting research, policy, and practice* (pp. 195-207). New York, NY: Teachers College Press.

Consortium on Chicago School Research (CCSR). (2007). *Freshman year: The make-it or break-it year, Fall 2007. [Teacher Edition]*. Consortium on Chicago School Research.

Conus, X, & Fahrni, L. (2019). Routine communication between teachers and parents from minority groups: An endless misunderstanding? *Educational Review, 71,* 234-256.

del Valle, G. B. (2011). Using a web-based program to increase parental involvement: Teachers' and administrators' perceptions. (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3514602)

Dries, S. D. (2014). The influence of parent portal access on student efficacy and parental involvement. (Doctoral dissertation). Retrieved from eRepository at Seton Hall. (2076)

Epstein, J. L. (1987). Toward a theory of family-school connections: Teacher practices and parent involvement. In K. Hurrelman, F. Kaufmann, & F. Losel (Eds.), *Social intervention: Potential and constraints (*pp. 121-136). New York: DeGruyter.

Epstein, J. L. (2011). *School, family, and community partnerships: Preparing educators and improving schools, 2nd Edition*. Boulder, CO: Westview Press.

Epstein, J. L., Sanders, M G., & Sheldon, S. B., et al. (2019). *School, family, and community partnerships: Your handbook for action, fourth edition*. Thousand Oaks, CA: Corwin.

Farrington, C. A. (2014). *Failing at school: Lessons for redesigning urban high schools*. Teachers College Press.

Gardner, W., Mulvey, E.P., and Shaw, E.C (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin, 118,* 392-404.

Green, C. L., Walker, J. M. T., Hoover-Dempsey, K. V., & Sandler, H. M. (2007). Parents' motivation for involvement in children's education: An empirical test of a theoretical model of parental involvement. *Journal of Educational Psychology, 99,* 532 – 544.

Heppen, J. B., & Therriault, S. B. (2008). *Developing early warning systems to identify potential high school dropouts. Issue brief. National High School Center*.

Hollingworth, S., Mansaray, A., Allen, K., & Rose, A. (2011). Parents' perspectives on technology and children's learning in the home: Social class and the role of the habitus. *Journal of Computer Assisted Learning, 27,* 347-360.

Hoover-Dempsey, K. V., Ice, C. L., & Whitaker, M. C. (2009). "We're way past reading together:" Why and how parental involvement in adolescence makes sense. In: Hill, N.E., Chao, R. K., (Eds.), *Families, schools, and the adolescent: Connecting research, policy, and practice*. New York, NY: Teachers College Press.

Hoyle, R. H., & Gottfredson, N. C. (2015). Sample size considerations in prevention research applications of multilevel modeling and structural equation modeling. *Prevention Science, 16*(7), 987-996.

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. *Urban Education*, *42*(1), 82-110.

Johnson, P. (2013). The impact of technology on parental involvement: Perceptions of teachers and guidance counselors regarding the impact of a parent portal component of a student information system on parental involvement at the high school level. (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global.

Koch, C. S. (2010). The function of electronic communication devices in assisting parental involvement in middle schools. (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3420561)

Kokoszka, K. A. (2009). A case study approach to the perceptions of Edline, a K-12 technology solution software, at a small Catholic high school in southern Massachusetts. (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3355870)

Kraft, M. A., & Rogers, T. (2015). The underutilized potential of teacher-to-parent communication: Evidence from a field experiment. *Economics of Education Review, 47,* 49-63.

Laho, N. S. (2019). Enhancing school-home communication through learning management system adoption: Parent and teacher perceptions and practices. *School Community Journal, 29,* 117-142.

Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity?. *Educational Researcher, 31*(1), 3-12.

Levine, L. (2018). Closing the digital divide: A justification for government intervention. *The M in CITAMS@30*. Published online: 03 Dec., 9-36, doi: 10.1108/S2050-206020180000018003.

Mac Iver, M.A., & Messel, M. (2013). The ABCs of keeping on track to graduation: Research findings from Baltimore. *Journal of Education for Students Placed at Risk, 18,* 50-67.

Mac Mac Iver, M.A., Sheldon, S., Epstein, J., Rice, E., Mac Iver, D. & Simmons, A. (2018). Engaging families in the high school transition: Initial findings from a continuous improvement initiative. *School Community Journal, 28,* 37-66.

Mac Iver, M. A., Sheldon, S. & Clark, E. (2021). Widening the portal: How schools can help more families access and use the parent portal to support student success. *Middle School Journal,* 52, 14-22.

Mac Iver, M. A., Stein, M., L., Davis, M. H., Balfanz, R., & Fox, J. (2019). An efficacy study of a ninth grade early warning indicator intervention. *Journal of Research on Educational Effectiveness, 12,* 363-390. doi: 10.1080/19345747.2019.1615156

Miller, R. G., Brady, J. T., & Izumi, J. T. (2016). Stripping the wizard's curtain: Examining the practice of online grade booking in K-12 schools. *School Community Journal*, 26, 45-69.

Mubarak, F., Suomi, R., & Kantola, S. P. (2020). Confirming the links between socio-economic variables and digitalization worldwide: the unsettled debate on digital divide. *Journal of Information, Communication and Ethics in Society*.

National Research Council. (2004). *Engaging schools: Fostering high school students' motivation to learn.* Washington, DC: The National Academies Press.

NEA (2011). *Family-school-community partnerships 2.0: Collaborative strategies to advance student learning.* Washington, DC: Author. Retrieved from http://www.nea.org/assets/docs/Family-School-Community-Partnerships-2.0.pdf

Neild, R. C., Balfanz, R., & Herzog, L. (2007). An early warning system. *Educational leadership, 65*(2), 28-33.

Olmstead, C. (2013). Using technology to increase parent involvement in schools. *TechTrends, 57*(6), 28-37.

Park, S., & Holloway, S. (2018). Parental involvement in adolescents' education: An Examination of the interplay among school factors, parental role construction, and family income. *School Community Journal, 28,* 9-36.

Patrikakou, E. N. (2016). Parent involvement, technology, and media: Now what? *School Community Journal, 26*(2), 9–24. Retrieved from http://www.schoolcommunitynetwork.org/SCJ.aspx

Pew Research Center. (2019, June 12). *Internet/broadband fact sheet.* Retrieved from https://www.pewresearch.org/internet/fact-sheet/internet-broadband/

Quinn, D. M. (2020). Experimental evidence on teachers' racial bias in student evaluation: The role of grading scales. *Educational Evaluation and Policy Analysis*, *42*(3), 375-392.

Raykov, T. (2011). Intraclass correlation coefficients in hierarchical designs: Evaluation using latent variable modeling. *Structural Equation Modeling*, *18*(1), 73-90.

Ream, R. K., & Palardy, G. (2008). Reexamining social class differences in the availability and the educational utility of parental social capital. *American Educational Research Journal,* 45(2), 238–273.

Robinson, C., Lee, M., Dearing, E., & Rogers, T. (2018). Reducing student absenteeism in the early grades by targeting parental beliefs. *American Educational Research Journal*, *55*, 1163-1192. Doi: 10.3102/0002831218772274

Rogers, T., & Feller, A. (2018). Reducing student absences at scale by targeting parents' misbeliefs. *Nature Human Behaviour, 2,* 335-342.

Rogers, T., Duncan, T., Wolford, T., Ternavoski, J., Subramanyam, S., & Reitano, A. (2017). A randomized experiment using absenteeism information to "nudge" attendance." Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. http://ies.ed.gov/ncee/edlabs.

Rogerson, S. (2020). The digital divide is a multi-dimensional complex. *Journal of Information, Communication and Ethics in Society*, 18, 321-21. https://doi.org/10.1108/JICES-05-2020-0060

Selwyn, N., Banaji, S., Hadjithoma-Garstka, C., & Clark, W. (2011). Providing a platform for parents? Exploring the nature of parental engagement with school learning platforms. *Journal of Computer Assisted Learning, 27,* 314-323.

Shayne, P. A. (2008). Home-school communication with parents of middle school students: A study on the effects of technology. (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3324218)

Simon, B. S. (2004). High school outreach and family involvement. *Social Psychology of Education, 7,* 185-209.

Sinclair, M. F., Christenson, S. L., & Thurlow, M. L. (2005). Promoting school completion of urban secondary youth with emotional or behavioral disabilities. *Exceptional Children, 71*(4), 465–482. doi:10.1177/001440290507100405

Snijders, T., & Bosker, R.J. (2012). *Multilevel analysis: an introduction to basic and advanced multilevel modeling.* Los Angeles: Sage.

Spera, C. (2005). A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. *Educational Psychology Review,* 17(2), 125-146.

Starkie, B. (2012). Data sharing through parent portals: An exploration of parental motivation, data use, and the promise of prolonged parent involvement. (Doctoral thesis). Retrieved from ProQuest Dissertations & Theses Global. (3525795)

Thompson, B. C., Mazer, J. P., & Flood Grady, E. (2015). The changing nature of parent–teacher communication: Mode selection in the smartphone era. *Communication Education, 64*(2), 187–207. doi:10.1080/03634523.2015.1014382

U.S. Department of Education. (2018). *High school students' views on who influences their thinking about education and careers*. National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC.

Wallace, M. (2013). High school teachers and African American parents: A (not so) collaborative effort to increase student success. *The High School Journal, 96,* 195-208.

Warren, M. R., Hong, S., Rubin, C. L., & Uy, P. S. (2009). Beyond the bake sale: A community-based relational approach to parent engagement in schools. *Teachers College Record,* 111, 2209–2254

Weiss, H. B., Lopez, M. E., & Caspe, M. (2018). *Joining together to create a bold vision for next-generation family engagement: Engaging families to transform education.* Boston, MA: Global Family Research Project. Retrieved from https://globalfrp.org/content/download/419/3823/file/GFRP_Family%20Engagement%20Carnegie%20Report.pdf

Weiss, H. B., Lopez, M. E., & Rosenberg, H. (2010). *Beyond random acts: Family, school, and community engagement as an integral part of school reform*. Washington, DC: U.S. Department of Education. Retrieved from www.hfrp.org/content/download/3809/104680/file/PolicyForumPaper-120710-FINAL.pdf

Weiss, H. B., Lopez, M. E., & Stark, D. R. (2011). *Breaking new ground: Data systems transform family engagement in education.* Retrieved from https://archive.globalfrp.org/publications-resources/browse-our-publications/breaking-new-ground-data-systems-transform-family-engagement-in-education2

Williams, T., & Sánchez, B. (2012). School parental involvement (and uninvolvement) at an inner-city high school. *Urban Education,* 47, 625-652.

Williams, T. T., & Sanchez, B. (2011). Identifying and decreasing barriers to parent involvement for inner-city parents. *Youth Society,* 45, 54–74. doi:10.1177/0044118X11

Zieger, L. B., & Tan, J. (2012). Improving parent involvement in secondary schools through communication technology. *Journal of Literacy and Technology, 13,* 30–54.

Figure 1

Ninth Grade Parent/Guardian Logins to the Parent Portal by Date, 2018-19

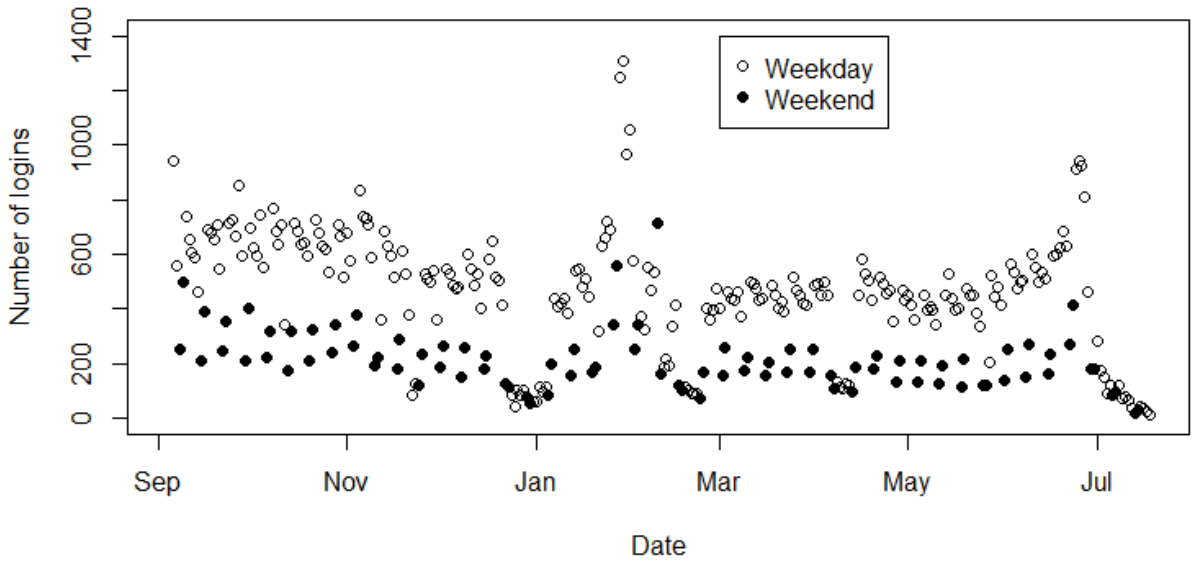
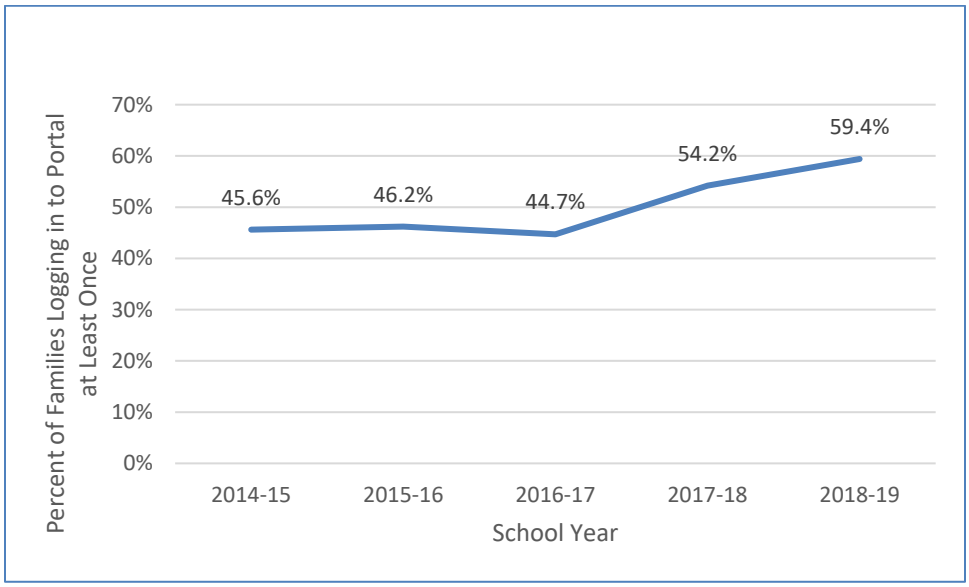


Figure 2

Percent of Ninth Grade Parents/Guardians Ever Logging In to the Parent Portal, by Year



*Denominator for each year is number of students with course grade data

Figure 3

Percent of Ninth-Grade Parents/Guardians Logging In to the Parent Portal, by Timeframes in 2018-19

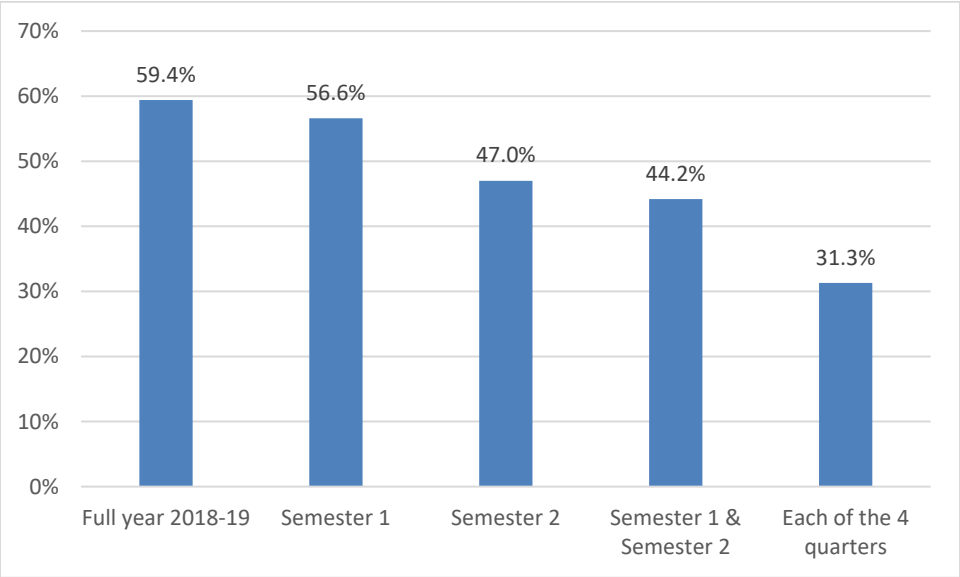
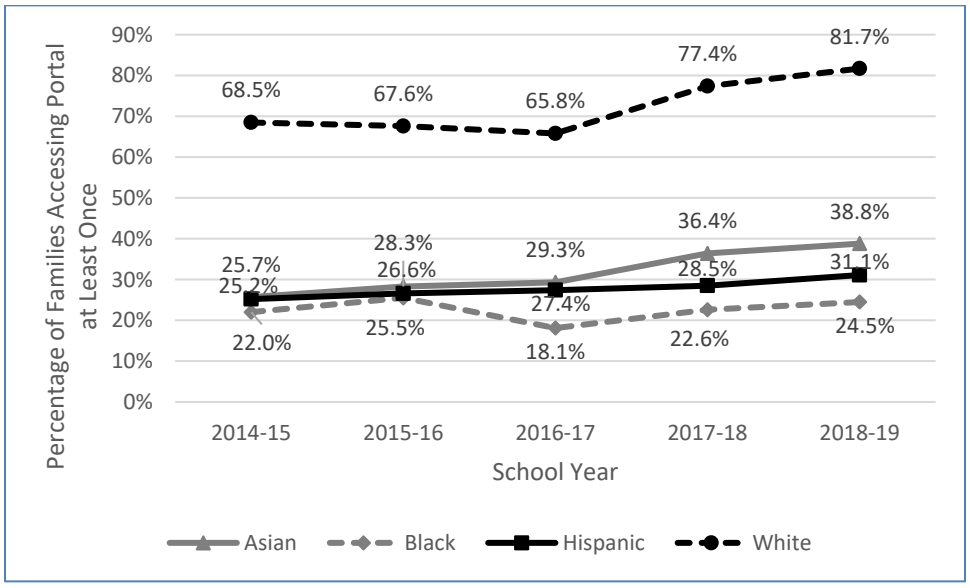


Figure 4

Percent* of Ninth Grade Parents/Guardians Ever Logging in to the Parent Portal, by Year and Student Ethnicity



*Denominator for each year is number of students with course grade data

Table 1

Coefficient Estimates for Probability of a Parent/Guardian Logging In to the Parent Portal during 2018-19

	During Semester 1		During Entire Year	
Student/school characteristic	Estimate (log odds)	Estimate (odds ratio)	Estimate (log odds)	Estimate (odds ratio)
Male student	0.09		0.08	
Asian student	- 0.57***	0.57	- 0.66***	0.52
Black student	- 1.37***	0.25	- 1.48***	0.23
Hispanic student	- 1.02***	0.36	- 1.05***	0.35
Other non-White student	- 0.60***	0.55	- 0.65***	0.52
Special education student	- 0.66***	0.51	- 0.61***	0.54
Home language not English	- 1.57***	0.21	- 1.63***	0.20
School % FRL	- 0.03***	0.97	-0.02***	0.98
Intercept		1.06***		1.29***
Between-school variance:				
Unconditional		0.62		0.56
Conditional		0.12		0.14
ICC*				
Unconditional		0.16		0.15
Conditional		0.04		0.04

N(schools) = 11; n(students) = 3501 * p < .05; ** p < .01; *** p < .001; ICC = Intraclass Correlation Coefficient

Table 2

Coefficient Estimates for Login Frequency in Semester 1 of 2018-19

Family characteristic	Estimate	Standard error
Intercept	3.16***	0.09
Male student	0.26***	0.06
Asian student	-0.08	0.10
Black student	0.08	0.14
Hispanic student	-0.03	0.11
Other non-White student	-0.16^	0.10
Home language not English	0.11	0.11
Special education student	0.01	0.10
Number of children in district	0.07^	0.04

N(schools) = 11; n(students) = 3275. Negative binomial model includes school fixed effects. For small coefficients x, exp(x) is very close to 1 + x, so the coefficient is interpretable as a percentage increase/decrease.
^ p < .10; * p<.05; ** p < .01; *** p < .001

Table 3

Semester 1 Course Failure among Ninth-Grade Students with at Least One Failing Grade in Quarter 1, by Parent/Guardian Logins to the Parent Portal in Semester 1 of 2018-19

Semester 1 Course Failure	Parent/guardian logins to parent portal in semester 1	
	Did not log in	Logged in
Student did not fail a course	42.1% (*n*=159)	53.0% (*n*=105)
Student failed a course	57.9% (*n*=219)	47.0% (*n*=93)

N=576 (Number of ninth-grade students with at least one failing grade during Q1)

Table 4

Coefficient Estimates for Probability of Failing at Least One Course in Semester 1 of 2018-19

Student/school characteristic	Estimate (log odds)	Estimate (odds ratio)
Male student	0.453**	1.57
Asian student	-0.038	
Black student	0.750**	2.12
Hispanic student	0.605**	1.83
Other non-White student	0.462	
Special education student	0.572***	1.77
Failed at least one course Quarter 1	3.318***	27.61
School % FRL	0.002	
Parent/guardian accessed portal during Semester 1	- 0.556**	0.57
Intercept	-3.812***	
Between-school variance:		
Unconditional	0.008	
Conditional	0.007	
ICC:		
Unconditional	0.002	
Conditional	0.002	

N(schools) = 11; n(students) = 3275
* p<.05; ** p < .01; *** p < .001

Table 5

Coefficient Estimates for Probability of Failing at Least One Course in Semester 2 of 2018-19

Student/school characteristic	Estimate (log odds)	Estimate (odds ratio)
Male student	-0.126	
Asian student	0.151	
Black student	0.633**	1.88
Hispanic student	1.070***	2.92
Other non-White student	0.880***	2.41
Special education student	0.517***	1.68
Failed at least one course Semester 1	2.717***	15.14
School % FRL	0.013***	1.00
Parent/guardian accessed portal during Semester 2	-0.386**	0.68
Intercept	-2.846***	
Between-school variance:		
Unconditional	0.209	
Conditional	0.057	
ICC:		
Unconditional	0.060	
Conditional	0.017	

* p<.05; ** p < .01; *** p < .001

N(schools) = 11; n(students) = 3419