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Are The Rich Getting Richer?
How School District Wealth Predicts Website Traffic Expenditures

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As Internet technologies have advanced, private industries and businesses in the United States (U.S.) and around the world have leveraged the ability to market on the Internet to drive traffic to their websites (Baye et al., 2015; Ilfeld & Winer, 2002). Such strategies as purchasing banner advertisements, search-engine optimizing webpages, and buying search results placement are well-known techniques that businesses employ to drive Internet traffic and increase their visibility online, while simultaneously improving their bottom line (Bauer & Latzer, 2016). However, K-12 educational research has lagged behind business and marketing research in this regard, as no extant studies have critically analyzed how K-12 school districts leverage the same Internet technologies to strategically spend money to drive Internet traffic to their school district website.

Popular search engines such as Google and Bing have increased their Internet popularity over the past decade, as these two search engines comprise nearly 100% of all search traffic in the United States and around the world (Law, 2019). Google, specifically, has dominated the online advertising and web traffic marketplace (Law, 2019). Recent research has suggested that institutions of higher education have leveraged Google's popularity to purchase online advertising and drive traffic to their institutional website through the Google search engine (Taylor & Bicak, 2020). For instance, the University of Phoenix has been known to spend millions of dollars per month to attract web visitors to their website in hopes of enrolling students and garnering tuition dollars (Leichenko, 2017).

Meanwhile, a longitudinal body of research has documented how K-12 school districts spend their finances on a wide variety of educational necessities. In-depth analyses of school district spending on curricular materials (Johnson & Jackson, 2019), recruitment of teachers (Darling-Hammond, 2010), professional development (Killeen et al., 2002), and capital projects (Young et al., 2003) have provided the field with a good understanding of how schools do business and expend capital. As school choice and competition has increased in recent decades (Behrends et al., 2019), educational research researchers have also explored how school districts spend money to compete with each other through advertising and marketing techniques (Jabbar, 2016; Lubienski & Lee, 2016).

However, beyond content analysis and investigations of school districts use of the Internet to improve curricular materials (Hew & Cheung, 2013), no studies focused on K-12 school districts have investigated the amount of money K-12 school districts spend on the Google search engine to drive traffic to their school district website.

As a state ripe for competition among K-12 school districts, Texas has been aggressive in charter school expansion, putting pressure on traditional public school districts to recruit and retain high-quality teachers and administrators, and students and their families (Heilig et al., 2016; Miller, 2019). Using data from Texas as a digital case study, this investigation explores how K-12 school districts in Texas spend taxpayer dollars on driving traffic toward their school district website, informing how these school districts are competing with each other and how they may view the Internet as a competitive marketplace. Ultimately, this study seeks to fill a gap in the literature and explore how K-12 school districts spend to drive traffic, and interest, toward their school district website. Specifically, using 2017-2018 Texas Education Agency (TEA) data and corresponding web traffic data reported by Google, this study addresses two primary research questions:

> RQ1: How much do K-12 school districts in Texas spend per month on driving traffic toward their website across district types and Texas Education Agency regions?
> RQ2: Which K-12 school district characteristics best predict spending on driving traffic toward K-12 school district websites?

Our research questions provide insight for the educational research community on the utility of "traffic cost" as a metric for measuring how Texas K-12 school districts are spending taxpayer dollars to position themselves strategically against other school districts.

Literature Review

Prior to the study at hand, decades of research have examined how K-12 school districts spend their finances (Darling-Hammond, 2010; Hew & Cheung, 2013; Jabbar, 2016; Johnson & Jackson, 2019; Killeen et al., 2002; Lubienski & Lee, 2016; Young et al., 2003). A review of literature regarding district spending does not serve the purpose of answering this study's main research questions related to school district investment in their school district website. As a result, this focused literature review will provide an overview of how educational researchers have specifically addressed how K-12 school districts invest in their website—in a variety of ways—to inform this study's main aims.

To date, the largest body of research on K-12 school district websites has focused on how school districts invest in online learning technologies, including how students interact with digital learning materials (Staker & Horn, 2012) and how teachers learn to develop and deliver digital curriculum (Davis & Krajcik, 2005). Adjacent studies have explored how teachers have required school districts to invest more heavily in websites and curricular materials to gamify learning materials (Denham et al., 2016) and integrate social media into the educational lives of students (Kimmons et al., 2018). However, studies specifically focused on how K-12 school districts invest in their district website to market their educational services to diverse stakeholders has been somewhat limited.

Specific to online investment in marketing and communication to compete with other school districts, one study found that some K-12 charter school districts do engage with outside consulting firms to better understand how to improve their website and market to prospective students and their families (Jones & Figueiredo-Brown, 2018). In their study of 13 school districts across six states, Jones and Figueiredo-Brown (2018) found that many of these virtual school districts still employed word-of-mouth techniques from parent-to-parent and from guidance counselor-to-guidance counselor. In fact, Jones and Figueiredo-Brown (2018) wrote, "...virtual school leaders did not feel they had adequate preparation to compete with the marketing teams supplied by corporate agencies for their for-profit virtual schools and their efforts sometimes reflected that" (p. 103). Here, many virtual school districts—even without physical campuses—did not fully engage with marketing teams to promote the school district in online spaces and on their school district website.

Similarly, Jabbar's (2016) investigation into school choice and competition in post-Katrina New Orleans revealed how K-12 school districts invest in their website to drive interest in their school district. Jabbar (2016) asserted that 27% (n=8) of the schools in the study participated in television, radio, or web advertising. However, Jabbar (2016) did not delve into the specific details regarding how much each school district was spending and which media outlet was receiving the greatest amount of school district marketing funds. Ultimately, Jabbar (2016) reasoned that "all of the schools had some type of website, though they varied in terms of the richness of their content" (p. 13), concluding that more research was necessary into the sub-field of K-12 school district online marketing.

Miller (2017) also investigated how a Catholic K-12 school attempted to compete in the education marketplace by improving their marketing techniques to recruit students and teachers. Miller (2017) found that the Catholic school's marketing plan "targeted the parents of children in before- and after-school care specifically and implemented an improved website" (p. 30). In a description of the new website investment, one of Miller's (2017) interview participants, one of the Catholic school leaders, wrote:

> I am delighted to announce the school has an improved website, which has been many months in the planning. The school felt it wanted to bring everything into one place so the community would be able to access the content more easily. This is also an opportunity for you to interact and provide feedback on any improvement you might have. I hope that you enjoy discovering the new website and that you find it easy to navigate and pleasant to use. Everything is very organized, so you will always be able to find exactly what you are looking for. (p. 106)

Yet, Miller (2017) did not investigate specifically what the school spent on their website improvement and how this marketing tool was used to drive traffic toward their school website, thus driving stakeholder interest in enrolling in the school.

Tangential to the way K-12 school districts invest in their district website, Kimmons et al. (2019) focused on the manner in which school districts adopted different website publishing systems (either open source vs. proprietary/purchased). Ultimately, Kimmons et al. (2019) learned that of all K-12 schools in the United States (N = 98,477), the overwhelming majority of K-12 schools adopted proprietary or purchased website publishing systems, possibly speaking to how K-12 schools and school districts may not be able to staff the technical support necessary to build unique websites. Kimmons et al. (2019) also learned that the primary technologies on K-12 school district websites beyond pedagogical software (e.g., Edmodo) were social network services (42.8% of all websites), administrative and office support tools (23.85%), academic or administrative tools (22.1%) and media sharing tools (9.7%). Kimmons et al. (2019) did not find evidence to suggest that K-12 school district websites purchased specific web tools for their website to drive traffic or market to specific audiences. Instead, the authors did reason that "schools are using these tools not for their teaching and learning benefits, but for their non-pedagogical marketing, communication, and outreach functions" (p. 195). However, Kimmons et al. (2019) did not elaborate on the cost of these website augmentations or how K-12 school districts specifically financed web traffic toward their school district website.

Beyond attempts at investing in school district websites to drive traffic, Maranto and Shuls (2012) analyzed the websites of 53 districts labeled as a geographic shortage districts (GSD) by the Arkansas Department of Education and found that few websites were informative and intuitive. The authors reasoned that of all GSD websites, very few featured content to recruit teachers, while a charter school's website "was superior to other school websites in the sample" and "…displayed pictures of students and provided useful information to prospective teachers," (p. 6). Similarly, Fernandez'

(2020) suggested that some K-12 school district websites may attempt to publish and promote web materials to recruit teachers, including teachers in high-demand disciplines such as mathematics (Fernandez, 2020). However, Fernandez' (2020) study did not delve into the cost of these measures or how K-12 school districts use other website-based marketing techniques to recruit students and teachers to compete in the educational marketplace.

Ultimately, these studies comprise a minimal body of research related to how K-12 school districts invest in their school district website to drive traffic toward that website, thus possibly increasing student, parent, family, and teacher interest in that district. As a result, this study will fill the gap in the literature by estimating the amount of money Texas K-12 school districts spent to generate traffic to their school district websites during the 2017-2018 school year and whether district indicators of wealth predict traffic cost spending. It is our hope that filling this gap in the literature will inform future studies as to how K-12 school districts may spend—and compete—in online spaces, an increasingly competitive venue in K-12 education.

Methods

This section outlines the way we identified this study's population and sample, the manner in which we collected and analyzed the data, and the means by which we addressed our limitations.

Rationale for Texas

The research team viewed Texas as an appropriate site for this state-level case study exploring traffic cost expenditures of K-12 school districts for several reasons. First, Texas has spawned several national charter school organizations (Whitmire, 2019), and charter school district enrollment continues to grow, with nineteen new charter schools opening in the North Houston area alone since 2016 (Zedaker, 2019). In 2018, 705 charter schools were serving 296,213 students in Texas, while nearly 150,000 students remained on waitlists, illustrating the demand for charter school education in Texas (Texas Charter Schools Association, 2018). This expansion of charter school education in Texas may begin producing a sense of competition among K-12 school districts in Texas, possibly influencing how K-12 school districts spend on their school district websites.

Moreover, the state of Texas has been rapidly growing over the past decade, consistently placing in the top ten in the United States in numeric growth, leading the nation in from July 2018 to July 2019 with over 360,000 new residents (United States Census Bureau, 2019). In Texas, this growth has occurred during a time when many states have experienced population decline (Nadworny, 2019). As a result, Texas is an important state to analyze in terms of K-12 school district Internet investment, given its growth in both overall and college-going population (Nadworny, 2019; United States Census Bureau, 2019), along with its competitive education marketplace (Whitmire, 2019; Zedaker, 2019).

Population and Sample

In 2018, the Texas Education Agency (TEA) oversaw 1,203 public school districts, open enrollment public charter school districts, and juvenile justice and in-live facilities, in addition to the Texas School for the Blind and Visually Impaired and the Texas School for the Deaf. However, the vast majority of Texas school districts are either public charter districts in predominantly urban areas (14.9% of all districts) or traditional public school districts in remote,

rural areas (38.3% of all districts), compared to only 11 major urban school districts as classified by the TEA (TEA, 2018). This led to an interesting challenge in terms of sampling for this study, as it was not feasible to gather online data from all 1,203 districts in a timely manner.
As a result, we employed purposive random sampling across each TEA district type to identify a sample for this study. We used GPower, a statistical software tool, used to calculate the statistical power necessary for collecting data from a large enough sample of our overall population (Texas K-12 districts). Within GPower, we set sampling power parameters to 95% confidence interval. This resulted in 764 Texas K-12 districts being assigned to this study across all nine TEA district types and all twenty TEA regions, which are education service centers dispersed across Texas. Table 1 displays an overview of the districts in this study.

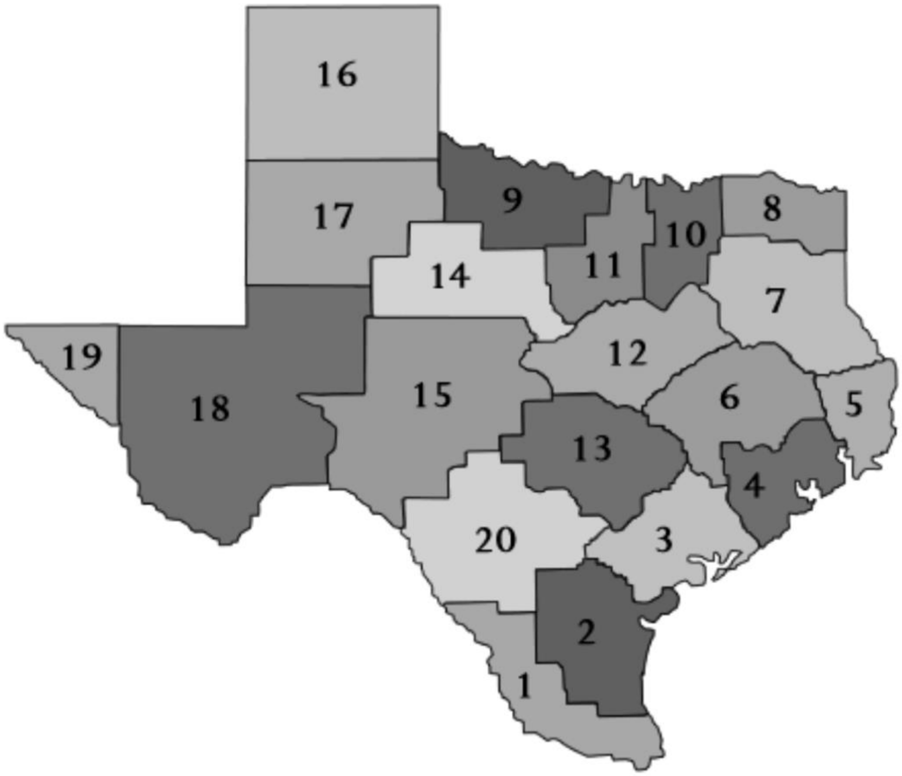
Table 1

Description of Texas K-12 school districts in the sample (n=764)

District Type	n	TEA Region	n
Charter School	123	Region 1 – Edinburg	22
Rural	210	Region 2 – Corpus Christi	28
Independent Town	58	Region 3 – Victoria	22
Other Central City	35	Region 4 – Houston	75
Other Central City Suburban	115	Region 5 – Beaumont	24
Non-Metropolitan, Fast Growing	26	Region 6 – Huntsville	33
Non-Metropolitan, Stable	120	Region 7 – Kilgore	56
Major Suburban	66	Region 8 – Mount Pleasant	30
Major Urban	11	Region 9 – Wichita Falls	23
Total	764	Region 10 – Richardson	97
		Region 11 – Fort Worth	53
		Region 12 – Waco	49
		Region 13 – Austin	43
		Region 14 – Abilene	20
		Region 15 – San Angelo	26
		Region 16 – Amarillo	41
		Region 17 – Lubbock	30
		Region 18 – Midland	17
		Region 19 – El Paso	15
		Region 20 – San Antonio	60
		Total	764

Figure 1

Map of Texas Education Association (TEA) Regions



Data Collection

We gathered data for this study from two sources: the TEA (2019) reports database and SEMrush (2019). Texas school districts must report data to the TEA, including total student enrollment, expenditures, local tax rates, and other information in order to maintain eligibility for state funding. We gathered TEA data that may influence online spending and advertising, including TEA region, per-pupil spending, number of district campuses (individual schools), total operating expenses, and total district enrollment.

SEMrush is a quantitative analytic tool used by website developers and software engineers to evaluate the popularity and cost of websites in an effort to inform online advertising techniques, optimize search-engines across desktop and mobile devices, and boost website visibility (SEMrush, 2019). To provide this insight, SEMrush's interface connects with Google's application program interface (API), specifically Google's paid search and advertising data. As a result, SEMrush can measure a website's size and popularity on the Internet, along with how much money is spent on hosting a website's traffic and whether the website pays for prioritized search results placement in Google's search engine. Other studies focused on higher education have used SEMrush to analyze how web metrics may influence *U.S. News & World Report* rankings (Taylor et al., 2018), the competitiveness of historically Black colleges and universities (Taylor, 2018), and how website popularity compares to institutional size (Alsmadi & Taylor, 2019). Using SEMrush, we entered the home URL for each school district (e.g., https://www.houstonisd.org/) and gathered SEMrush data pertinent to each school district's Internet investment (in traffic cost) on their school district website. Traffic cost is the monthly cost incurred to the website administrator (school district) to facilitate search results placement on the Google search engine, including both organic search traffic and paid search results (Taylor et al., 2019).

Data Analysis

First, we generated nonparametric descriptive statistics (means, standard deviations) comparing the traffic cost expenditures of Texas school districts by district type and TEA region, given this study reports novel data in the K-12 educational technology landscape (Table 2). Then, after gathering one year of TEA data (2018-2019) and corresponding year SEMrush data (2018-2019), we employed OLS regression to predict the traffic cost of K-12 school districts using TEA (2019b) data related to school district expenditures. To build the model, the research team hypothesized that several district-level TEA (2019b) variables could be predictive of traffic cost, including geographic location, using TEA region as a proxy. Moreover, the team considered other district-level TEA variables related to a school district's size, including number of district campuses, full-time employees, and number of enrolled students. However, after performing variance inflation factor (VIF) analyses, we learned that several of these variables were collinear, and thus, removed from our model to ensure its integrity.

Similarly, the research team considered district-level TEA variables related to finances, including administrator, teacher, and staff salaries, district revenue and expenses, and per-pupil spending across several contexts (e.g., operating expenses per pupil, instructional expenses per pupil). As before, once integrating these finance-related variables into our model, we again performed VIF analyses and removed multicollinearity from the model. Once we completed VIF analyses, we transformed large scale variables to the logarithmic scale to conform the data to normal distribution and decrease the variability of residuals for our outcome variable (traffic cost). To increase the reliability and transparency of this study, the research team can make this study's dataset available upon request.

Results

Descriptive statistics of traffic cost expenditures of Texas K-12 school district websites can be found in Table 2.

Table 2

Descriptive statistics of web metrics of Texas K-12 district websites, August-October 2018, by district type and TEA region

District Type	Traffic Cost	
	Mean	SD
Charter School (n=123)	5,219	18,216
Rural (n=210)	419	1,959
Independent Town (n=58)	4,004	9,089
Other Central City (n=35)	74,905	130,553
Other Central City Suburban (n=115)	12,734	25,915
Non-Metropolitan, Fast Growing (n=26)	3,161	5,595

Non-Metropolitan, Stable (n=120)	1,749	5,958
Major Suburban (n=66)	99,340	247,148
Major Urban (n=11)	468,313	414,661
TEA Region		
1 - Edinburg (n=22)	17,815	31,366
2 - Corpus Christi (n=28)	6,612	20,138
3 – Victoria (n=22)	1,829	4,911
4 – Houston (n=75)	80,674	293,162
5 – Beaumont (n=24)	5,891	23,904
6 – Huntsville (n=33)	21,311	82,848
7 – Kilgore (n=56)	4,572	14,298
8 - Mount Pleasant (n=30)	2,037	6,204
9 - Wichita Falls (n=23)	1,505	4,606
10 – Richardson (n=97)	25,738	84,513
11 - Fort Worth (n=53)	37,044	95,584
12 – Waco (n=49)	5,847	21,747
13 – Austin (n=43)	44,945	124,998
14 – Abilene (n=20)	4,450	21,190
15 - San Angelo (n=26)	4,450	13,871
16 – Amarillo (n=41)	663	2,359
17 – Lubbock (n=30)	5,083	18,744
18 – Midland (n=17)	11,159	30,313
19 - El Paso (n=15)	53,510	114,004
20 - San Antonio (n=60)	18,178	54,741
Sample (n=764)	22,314	110,403

Evidenced by data in Table 2, there exist considerable differences in the traffic cost expenditures across district type. By district type, major urban districts far outspent their rural and non-metropolitan school district peers, as major urban districts averaged traffic costs of $468,313 per month from August to October 2018, whereas rural districts only averaged $419 per month during the same period. This result may suggest that there is a relationship between the relative size or geographic location of a K-12 school district and its traffic cost toward its district website, making a unique contribution to the literature.

There was also considerable variance within district type, as major urban and major suburban school districts featured large standard deviations regarding traffic cost expenditures. For example, major suburban school districts featured a traffic cost standard deviation of $247,148 per month, even though their mean expenditures were only $99,340 per month. Inverse mean-to-standard deviation ratios were also apparent among central city school districts. These figures strongly indicate stratified traffic cost expenditures within district types, suggesting that there may be different district-level circumstances that influences how K-12 school districts spend on traffic cost. As a result, predicting traffic cost by district type alone may not be informative, given these apparent differences.

By TEA region, and similar to results by district type, data in Table 2 suggest considerable differences in the traffic cost expenditures across TEA regions. Major metropolitan TEA regions such as Houston (m=$80,674), El Paso (m=$53,510), Austin (m=$44,945), and Fort Worth (m=$37,044) outspent many of their more-rural TEA region counterparts, including Amarillo (m=$663) and Wichita Falls (m=$1,505). However, other major metropolitan TEA regions such as San Antonio (m=$18,178) and Richardson (m=$25,738) did not spend nearly as much per month as other major metropolitan TEA regions, again suggesting that TEA region or geography alone cannot predict traffic cost expenditures of K-12 school districts.

Supporting the result that traffic cost cannot be predicted solely by TEA region, standard deviations within district types suggest that there are other district-level factors associated with traffic cost expenditures. For example, every TEA region in this study featured a larger standard deviation than mean traffic cost, signaling considerable variance for how *different* K-12 school districts in the *same* TEA region spend on driving Internet traffic toward their school district website. For instance, in the TEA region of Huntsville, the average K-12 school district spent $21,311 per month from August to October 2018 on driving traffic to their district website, whereas the standard deviation across all K-12 school districts in the Huntsville region was nearly four times that amount: $82,848. Here, these figures likely indicate that several K-12 school districts in Huntsville far outspent others in Huntsville, contributing to the low means and high standard deviations in traffic cost for this TEA region. Ultimately, data in Table 2 strongly suggest considerable variance within both district type and TEA region regarding traffic cost expenditures from school district to school district.

A regression analysis predicting traffic cost expenditures for Texas K-12 school district websites can be found in Table 3.

Table 3

Regression analyses predicting traffic cost of Texas K-12 school districts (n=764)

Variables				
#Region	ß	Std. Error	*t*	Sig.
3 - Victoria	1.189	.562	2.12	0.04*
4 - Houston	1.079	.491	2.20	0.03*
6 - Huntsville	1.298	.508	2.56	0.01**
7 - Kilgore	0.971	.474	2.05	0.04*
9 - Wichita Falls	1.426	.559	2.55	0.01**
10 - Richardson	1.152	.471	2.44	0.02*
11 - Fort Worth	1.156	.488	2.37	0.02*
12 - Waco	1.007	.483	2.09	0.04*
13 - Austin	1.401	.499	2.82	0.01**
15 - San Angelo	1.451	.530	2.74	0.01**
19 - El Paso	1.867	.672	2.78	0.01**
District campuses	0.001	.004	0.26	0.80
Full-time employees (log)	1.348	.794	1.70	0.09
Local tax rate	1.208	.581	2.08	0.04*
Central admin. salaries (log)	0.100	.410	0.24	0.81
Campus admin. salaries (log)	1.064	.590	1.80	0.07
Staff salaries (log)	1.189	.601	1.98	0.05*
Tax value per pupil (log)	0.198	.124	1.59	0.11
Total district revenue (log)	-1186.244	1718.580	-0.69	0.49
Revenue per pupil (log)	1186.796	1718.551	0.69	0.49
Total expenses (log)	-0.225	.339	-0.66	0.51
Operating expenses (log)	1185.794	1718.561	0.69	0.49
Operating expenses per pupil (log)	-1188.017	1718.538	-0.69	0.49

Instructional expenses per pupil (log)	0.838	1.145	0.73	0.46
Constant	-23.120	9.922	-2.33	0.02
Number of institutions	764			
Adjusted R-squared	0.72			

#Region 1 Edinburg = control group; only statistically significant regions reported for simplicity.
Notes: Robust standard errors in parentheses; ***$p < 0.001$, **$p < 0.01$, *$p < .05$

Data in Table 3 suggest TEA region best predicts K-12 school district spending on driving traffic to school district websites, and school district membership in certain TEA regions were more predictive than others. First, controlling for many district-level size (e.g., campuses) and finance variables (e.g., tax value per pupil), the TEA regions of Corpus Christi, Beaumont, Mount Pleasant, Abilene, Amarillo, Lubbock, Midland, and San Antonio were not statistically significant predictors of traffic cost. Supporting earlier results in Table 2, data in Table 3 suggest TEA region may not be the only predictor of traffic cost, as there may be district-level characteristics that influence traffic cost expenditures from district to district.

However, using the TEA region of Edinburg as a control group, many TEA regions were strongly predictive ($p < 0.05$, $p < 0.01$) of traffic cost expenditures. Although the TEA region of Houston spent the most on traffic cost (Table 2), the TEA regions of Huntsville, Wichita Falls, Austin, San Angelo, and El Paso were most predictive of traffic cost, controlling for district-level variables. Although there is little empirical evidence to inform why these TEA regions were most predictive of traffic cost, these results imply for future research into online spending of K-12 school districts in their pursuit of driving interest—and Internet traffic—toward their school district and corresponding website.

Considering district-level characteristics, many size- and finance-related TEA variables were not predictive of traffic cost across many different K-12 school districts. Even though the research team hypothesized that K-12 school districts may need to spend more on driving traffic depending on the size of their district, both district campuses ($p = 0.80$) and full-time employees ($p=0.09$) were not statistically significant predictors of traffic cost. Similarly, many finance-related TEA variables were not predictive either, as nearly all district-level salaries metrics and per-pupil spending metrics were not statistically significant.

However, answering this study's second research question, both local tax rates ($p < 0.05$) and staff salaries ($p < 0.05$) were statistically significant predictors of traffic cost, controlling for TEA region and many other district-level variables related to the size and finances of a K-12 school district in Texas. Although there is little extant or guiding research to support these results, several implications for K-12 school district spending and equity between school districts emerge from these results.

Limitations

This study was limited by several data-related, time-related, and research-related factors. First, this study's data is limited to both TEA data (one year) and SEMrush data (August to October 2018). As Internet information changes constantly, it is difficult to overgeneralize this study's findings, given that the traffic cost figures reported in this study are likely to change. In addition, SEMrush data was collected from the time period of August 2018 to October 2018, as this period represents the beginning of the academic year, even though traffic expenditures likely fluctuate throughout the academic year. Similarly, although some TEA data points do not drastically change from year to year (e.g., geographic location, TEA region, district type), many TEA data points do change, such as local tax rate, per-pupil spending, full-time employee figures, and many more. As a result, this study only means to provide a one-time perspective into how K-12 school districts in Texas spend on Internet traffic and how certain district characteristics may predict this cost.

Second, this study is also limited by the arduous nature of collecting SEMrush data from multiple websites. In all, this study included data from 764 unique K-12 school districts in Texas and their websites, but SEMrush is generally used by marketing and communications professionals working on one website, comparing their website to their competitors' websites (SEMrush, 2019). SEMrush also does not feature an export function to cleanly and efficiently choose web metrics (e.g., traffic cost) and export them from the SEMrush dashboard—all gathering of web metrics require entering a unique URL (e.g., https://www.houstonisd.org/) into the SEMrush search bar, one at a time. As a result, this study's data collection process was time consuming and limited the overall sample size of the study, as it was not feasible to gather web metrics from all K-12 school district websites in Texas.

This study is also limited by its analytic method and reliance on quantitative data sources. Ideally, researchers would gather multiple years of data and attempt to demonstrate causal effects of school district characteristics on traffic cost. In addition, qualitative and mixed methods researchers could augment this study's findings by expanding beyond a quantitative analysis, speaking with school district employees with knowledge of their website's investment costs and benefits.

Finally, this study's data collection and analytic technique is limited by the extant research related to K-12 school district spending on technology, specifically its school district website. Had there been prior research to suggest certain school district characteristics may predict spending on traffic, we would have gathered that data and integrated those variables into our regression model. However, given the gap in the literature, we had to hypothesize which district-level TEA variables may predict traffic cost expenditures, with little extant research guiding these decisions. Ultimately, although this study is primarily limited by its data sources and analytic strategy, it represents a unique contribution to the subfields of educational technology and marketing and communication, mitigating some of this study's limitations.

Discussion and Conclusion

To date, no extant research had explored how K-12 school districts spend to drive traffic to their school district's website. Given the results of this study, many implications for research, practice, and online equity between K-12 school districts emerge. In all, this study successfully answered its two primary research questions:

> RQ1: How much do K-12 school districts in Texas spend per month on driving traffic toward their website across district types and Texas Education Agency regions?
> RQ2: Which K-12 school district characteristics best predict spending on driving traffic toward K-12 school district websites?

Answering this study's first research question, the data in Table 2 suggest K-12 school districts in Texas spent in dramatically different ways regarding traffic cost, depending on the district type and

TEA region (i.e., geography). As a novel contribution to the literature on K-12 school district spending tendencies, this study suggests some K-12 school districts may spend hundreds of thousands of dollars per month driving traffic toward their websites (Table 2; e.g., major urban school districts), while others may only spend several hundreds of dollars (Table 2; e.g., rural school districts, Amarillo TEA region school districts). As a result, both future research and practice should investigate how school districts spend such vast sums of money on driving traffic toward district websites, paying special attention to how rural, low-income, or minoritized school districts may be affected by these spending tendencies.

Moreover, researchers should work with practitioners to understand why traffic cost is higher for some districts and not others, informing how low-income school districts can optimize their resources and compete with wealthier districts who may be able to afford larger websites and able to drive more Internet traffic. This research could investigate district-level nuances beyond TEA region. For instance, the TEA region of San Antonio encompasses both San Antonio ISD and Alamo Heights ISD, a neighboring district. In this instance, San Antonio ISD has levied a higher tax rate than Alamo Heights ISD, even though these districts are in the same TEA region and are adjacent from each other (Texas Association of Counties, 2018). As a result, these districts may have directly competed for students and had different levels of revenue to spend on Internet advertising, an important phenomenon to unpack in an open enrollment state such as Texas.

Speaking to the regression results in Table 2, educational researchers and policymakers should take note of the range of spending across different district types and TEA regions, focusing on why school districts spend so differently in online settings. The research team did hypothesize that population density or city population may influence traffic cost given the necessity for local parents and educational stakeholders to traffic their local school district's website. However, several densely populated TEA regions were not predictive of spending on traffic cost (Table 3). Similarly, some cities and TEA regions such as San Antonio are much larger than some cities and TEA regions such as Austin and Huntsville, yet school districts in San Antonio spent significantly less on website traffic (Table 2) than peer school districts. In short, a school district's size or geographic location is simply not enough to determine how a school district spends online, and future research should investigate this result in greater detail. Perhaps researchers could partner with school districts to access each district's Google Analytics data to better understand both *who* is visiting school district websites and *what* content they are accessing, possibly informing why school district spending on traffic varies so greatly from district to district.

Perhaps this study's most important results—and directly answering this study's second research question—is that both local tax rate and staff salaries strongly predict ($p < 0.05$) K-12 school district spending on driving traffic, controlling for many other TEA variables related to size and finance. As critical t values related to local tax rate ($t = 2.08$) and staff salaries ($t = 1.98$) were positive, these results indicate that as local tax rates and staff salaries increased across K-12 school districts, these districts' spending on traffic also increased. Informing these results, the Texas Comptroller of Public Accounts (2019) reported that K-12 school districts in Texas can raise local tax rates with the cooperation of their local appraisal districts. Per the Texas Comptroller of Public Accounts (2019):

> In Texas, local appraisal districts appraise and value property located within their boundaries. (Appraisal district boundaries coincide with county boundaries, but appraisal districts are not part of county governments.) Each local taxing unit in the appraisal district, including school districts, sets tax rates and collects property taxes based on those appraised values after

various deductions and limitations are applied. (para. 11)

Here, local tax rates of K-12 school districts in Texas are strongly tied to property value and a school district's ability to levy their local taxing unit to raise taxes, and thus, raise additional revenue for its school district. Directly connecting to this study's results, K-12 school districts in wealthier areas who have the ability to levy a higher local tax rate to support their school district may be able to spend more to drive traffic to their school district's website. Although we cannot say for certain that this phenomenon is occurring across all K-12 school districts in Texas, these implications for equity are troubling.

First, these results, paired with the Texas Comptroller of Public Accounts (2019) information, likely indicates that K-12 school districts in Texas can be socioeconomically stratified considering their local property valuations and ability to levy higher local tax rates to fund schools. Prior research has explored socioeconomic stratification of K-12 school districts (Behrends et al., 2019; Heilig et al., 2016; Jabbar, 2016; Johnson & Jackson, 2019; Lubienski & Lee, 2016). However, this study finds that the same socioeconomic stratification may exist in K-12 school district online spaces, as this study's results strongly suggest that a school district's ability to levy or maintain a high local tax rate to fund the district may carry over into traffic cost expenditures, further minoritizing low-income schools without high local property valuations and the inability to levy high local tax rates.

Moreover, if a school district can levy or maintain high local tax rates, the district may be able to spend more on staff salaries, evidenced by data in Table 3. TEA (2019b) data does not break down into specific salaries across different type of staff (e.g., clerical, technology, instructional). Yet, wealthier districts may be better positioned to pay higher salaries to Internet support staff, such as web developers and software engineers, to drive Internet traffic toward a school district's website. Here, wealthy K-12 school districts in Texas may be reaping the benefits of high local tax rates in two important ways that feed one another: They may have the finances to recruit and retain high-quality Internet support staff, who in turn have the financial resources to optimize a school district's website and drive traffic toward that site. This domino effect of levying high local taxes to pay high staff salaries to optimize and improve school district websites may be producing a socioeconomically stratifying effect in online spaces, a space previously underexplored by K-12 educational research.

Ultimately, the data in this study suggest that certain K-12 school districts in Texas may have a financial advantage when it comes to driving traffic to their websites. Specifically, data beg the question, "Are the rich getting richer?" Moreover, future research could consider exploring online wealth, or, the robustness of and investment in websites that K-12 school districts are making in Texas and beyond. Although a relatively new technology which has exploded over the past two decades, the Internet represents an incredible data source for all educational stakeholders and an important area of study for educational researchers. Without a critical investigation into how school districts spend taxpayer dollars and potentially minoritize low-income school districts, the rich may keep getting richer. This lack of investigation would ultimately leave low-income schools and students behind in an Internet era that perpetually moves forward.

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