TEXAS EDUCATION REVIEW

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TEXAS EDUCATION REVIEW

Welcome to Volume 8, Issue 2 (Spring 2020) of the Texas Education Review (TxEd)

This issue contains four manuscripts, including: a critical-poststructural meditation on the purposes of higher education in the neoliberal era (Epstein & McKinnon-Crowley); an examination of factors associated with school segregation in Texas (Mattison); a redefinition of augmented reality and a literature review of K-12 students' behavioral intentions to use AR (Ping & Liu); analysis of the cost of generating website traffic to randomly selected school districts in Texas (Childs & Taylor).

In addition to these pieces, this issue features three editorials, including: a call for white scholars to take up critical race stances as a means of disrupting hegemonic practices of whiteness in the academy (McLean & Alexander); an introductory exploration of Texas District of Innovation policy adoption and the potential issues it raises for racial and class-based equity in education (Guthery & Richards); and a reflection on the possibilities of integrating rural, place-based ways of knowing in higher educational institutions (Almond).

Information for Contributors

The Texas Education Review is an independent, peer reviewed, student-run scholarly publication based at the College of Education at The University of Texas at Austin. The Texas Education Review was founded and is operated by doctoral students at The University of Texas at Austin's College of Education, which consistently ranks as one of the best public university graduate education programs in the United States. The Texas Education Review aims to advance scholarship by publishing an academic journal of the highest quality including works by graduate students, professors, and practitioners, focusing on education policy and related issues. This journal features articles, essays, notes, and reviews relevant to a national and international audience of scholars and practitioners.

The Texas Education Review focuses on analysis of education policy and related issues, with nonexclusive preference given to issues affecting the State of Texas. Each issue shall display unparalleled excellence in content and style. Further, The Texas Education Review fosters the academic and professional development of its members through participation in the editorial process and each member displays the highest standards of integrity and professional excellence in every endeavor. From Sweatt v. Painter and No Child Left Behind, to charter schools, curriculum policy, and textbook adoption, the State of Texas has played and will continue to play a critical role in shaping education policy in the United States. The Texas Education Review is located directly on The University of Texas's campus in the heart of downtown Austin. Its close proximity to the Texas Capitol, Texas Education Agency, and State Board of Education offers unparalleled access to the thought leaders, policy makers, and academics who are driving education policy in Texas.

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(D)riven by Neoliberalism: Exploring Alternative Purposes for Higher Education

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(D)riven by Neoliberalism: Exploring Alternative Purposes for Higher Education

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The value of a degree. Social mobility. Job placement rates. Return on investment. These concepts permeate both the news media and academic discourse about higher education credentials. From provosts to presidents, students hear the message that getting a degree means getting a good job (Brown, 2015; Jaschik & Lederman, 2020; Obama, 2009). Higher education leaders view their provided credentials as commodities, acquired by monetary investment and converted into economic capital. Performance-based funding models similarly treat students as commodities, linking student performance on certain metrics to institutional income (Dougherty, Jones, Kahr, Pheatt, & Reddy, 2014). According to this logic, the benefit of higher education can only be understood inasmuch as it translates to economic or social gain, reproducing or altering class status (Morrison, 2017). In other words, higher education is only worthwhile if it generates revenue for students and schools. As a metanarrative, this notion of higher education as a means to individual gain is so entrenched in the discourse that it is almost impossible to think outside of it. How did we arrive at this notion and how can we think beyond it?

The current moment in which higher education institutions are shuttering and shifting due to the global COVID-19 pandemic provides an opportunity to reflect on what higher education is doing in our society and who, as it is currently formulated, is benefiting. Online higher education, until recently the domain of broad-access, for-profit institutions or if anything a second tier of education within elite institutions, has abruptly become the new normal for all institutional types. The pandemic flattened the types of institutional instructional modalities to all-online, eliding a previously treasured distinction between mass and elite higher education. When the physical classroom and the physical campus—both hallmarks of elite higher education—are unavailable, how can elite and broad-access institutions define their purpose?

In this editorial, we think with theories of the university. The notion of theories, rather than theory, frames the ways that the university is multiple, and possible, even when it is (d)riven by capital. We begin with historical framings of the U.S. university, and then examine the shift from capitalist, legitimizing, militarizing institutions to the totalizing entity of today's neoliberal university. We then explore alternate readings and alternate possibilities, presented through scholarship and activism. We highlight examples of educational underpinnings that have ethical rather than economic ends (Booker & Vissoughi, 2020), that engage the transformational (the learning) rather than the credentialling (the schooling) aspects of education. As scholar and poet Fred Moten noted: "…the contradictions between the university as hedge fund, the university as real estate company, and the university as an intellectual institution, those contradictions are not sustainable" (Neal, 2018). Elite higher education's ties to accumulation, of labor, of land, and of capital are not entirely reliant on the physical occupation of space and the in-person construction/examination of knowledge, but the

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physically distanced present provides an opportunity to reflect on what higher education is doing in our society and what futures it could have.

Higher Education and Neoliberalism in the US

Current cultural norms say that college degrees are crucial for economic stability of the individual and the global economy (Carnevale, Smith, & Strohl, 2013; Hout, 2012), a perspective that does not deviate far from the roots of higher education (Labaree, 2016). During the 19th century, the public university system was born as state governments began to see the benefit of building higher education campuses (Labaree, 2016). The benefits to the states included a more educated population—of White men—but also the accumulation (theft) of Indigenous land and resources (Boggs, Meyerhoff, Mitchell, & Schwartz-Weinstein, 2019). States accepted land and resources from the federal government, motivated by a desire to strengthen northern, "free" states, through First and Second Morrill Acts, which extracted resources from seized property to fund the development of a tiered system of higher education (Boggs et al., 2019; Lee & Ahtone, 2019).[2] These public institutions, along with the earlier elite private schools, however, were firmly rooted in capitalist growth and systemic self-interest, with the benefit of higher education accruing to the individual for their social or economic benefit (Labaree, 2016) and to the state, through its resource extraction (Boggs et al., 2019). Industrialization brought changes to the economy in specific ways for middle class families who no longer passed small businesses along to their descendants; higher education became a way for the children of these families to join an emergent professional class. Through the Second Morrill Act (1890), Black land-grant institutions were funded—at much lower rates than White universities—which focused on training teachers and agricultural workers (Boggs et al., 2019).

Our higher education system was built on an architecture of inequity (Labaree, 2016). American universities and colleges have always focused on providing a private benefit to the individual in the interest of the economy and the political position of the locality or nation, as well as the accumulation of capital, labor and land by the institution and state (Boggs et al., 2019). The influx of new matriculants and new government money into higher education brought on by both the G.I. Bill and Cold War concerns could be seen as a brief foray into conceptualizing higher education as a public good, but it was only a temporary blip in the longstanding United States philosophy of education as a private good (Olson, 1973; Labaree, 2016). The logics of educational provision remained rooted in capitalism. In fact, this "golden era" of state investment in education was motivated by the need for the absorption of a surplus of labor (i.e. soldiers returning from war) in order to prevent the collapse of the capitalist system (Boggs et al., 2019).

Though higher education initially only served the elite, even at scale and with open access, the higher education system continues to maintain inequity to the present day. The financial aid system illustrates the maintenance of inequity, with student debt loads and default rates falling most heavily on Black students and the shift from need-based to merit-based aid contributing to lower-income students' accrual of student debt rather than receipt of grant aid (Olbrecht, Romano, & Teigen, 2016; Scott-Clayton, 2018a; 2018b). We also see this effective maintenance of privilege (Lucas, 2001) today in the pyramidical hierarchy of higher education access, with elite institutions perched atop the broad base of open-access offerings (Cottom, 2017). Students who attend for-profit institutions,

[2] While a full examination of the development of land grant institutions is outside the scope of this paper, the authors recommend this in-depth reporting on *land-grab universities*: https://www.hcn.org/issues/52.4/indigenous-affairs-education-land-grab-universities

who are more likely to be students of color and lower-income students, are more likely to accrue debt and default on it (Scott-Clayton, 2018a; 2018b), meaning that the costs rather than any economic benefits of higher education maintain economic inequality.

Today, individuals cite economic concerns as the main reason for pursuing higher education. A recent Gallup poll found that 82% of college-degree holding adults said that they believed their degree was a beneficial financial investment (Haas, 2020). This drive towards a degree is commonly understood as a "natural" result of market forces in our capitalist society. Educational purpose over the last decades has been marketed as a means to create workers for jobs, obscuring the way that these workers provide exponential financial benefit to an elite group of (largely) White men in upper-class society (Labaree, 2016). It is possible that the growth in graduate program enrollment is a direct result of seeking more money through education credentials (e.g., Kot & Hendel, 2012).
Business leaders argue that there is a "skills gap" in the United States and new hires need training—accessed through higher education—to succeed in the workplace (Mattern, Burrus, Camera, O'Conner, Hansen, Gambrell, Casillas, & Bobek, 2014; Weathers, 2015). These leaders have called on the education system—all along the P-20 pipeline—to shape better-prepared workers for so-called twenty-first century jobs (Carnevale et al., 2013). Policymakers and legislators have responded to this call from the corporate sector and agreed that college and career readiness are a vital first step to provide individual students with a high quality of life as they transition into adulthood and the labor market (Loera, Nakamoto, Oh, & Rueda, 2013). Any rhetoric of education as a pursuit of critical thinking, community growth, interpersonal respect, and the common good has been subsumed to an economic purpose (Grant, 2012). Private and neoliberal approaches to education are the dominant orientation toward higher education, orientations that start in the K-12 system.

Neoliberalism and K-12 Education

Neoliberalism and the neoliberal university are phrases often tossed around in academia, though consensus about what they mean is absent (Brown, 2015). In traditional economic (not neo-) liberalism, the state should not interfere in any way with its citizens' lives—they possess freedom and the state should in no way curtail their autonomy. The early twentieth-century economist Fredrich Hayek, the philosophical godfather of neoliberalism, proposed that the market and the market alone, not any external agency like the government, should regulate how private businesses conducted their business dealings (Olssen & Peters, 2005). James Buchanan, writing after Hayek, modified Hayek's principles for private actors and applied them to the public sector (Olssen & Peters, 2005). In this editorial, we define neoliberalism as the dominant philosophical orientation that deploys the logic of the free market and requires individuals and other entities to be maximally productive and self-sufficient in order to justify their existence in an economic system built upon precarity (Biehl & Locke, 2017; Johnson, 2018; Olssen & Peters, 2005). We follow Wilson and Chivers Yochim (2017) in their framing of precarity as living under a governmental structure in which the only constant is economic uncertainty and the constant threat of economic collapse. As Brown (2015) wrote, neoliberalism is "the rationality through which capitalism finally swallows humanity" (p. 44). This process has been in full swing in America for the past 40 years.

In the United States, neoliberal policies can be traced back to the tax revolt era of and immediately before the Reagan presidency (Ambrosino, 2013), during which decreased support for paying taxes meant that governmental services depended on an ever-shrinking pool of funding. The logic of the market grew in scope to encompass provisions of services previously thought to be the purview of the government, including utilities and roads, for instance (Brown, 2015). Purported to be an

opportunity for individual agency and self-sufficiency without the suffocating oversight of the government, neoliberal philosophies required any entity receiving government funding to justify its existence in economic terms. Those that could not, such as non-profit organizations, were deemed undeserving of governmental subsidies and thus subject to privatization. Market forces dictate all institutional behavior and force all individual choices to be made in thrall to market; a point we elaborate on below.

Accountability. In neoliberal contexts, the only things worth measuring in the educational sector are those that are counted and countable, a perspective magnified in the current context. Educational outcomes must be quantified in terms of test scores and value-added education, paired with decreased state regulation and support to justify their receipt of funding (Gildersleeve, Kuntz, Pasque, & Carducci, 2010; Hursh, 2007). Biesta (2016) noted that standardized testing has shifted the public rhetoric—if not public opinion—about educational purpose, meaning that we have come to value what we measure, rather than measuring what we value. To pursue the elusive goal of financial and productive efficiency in public schools, educational leaders used management techniques taken from for-profit businesses. In an environment of constant austerity, state educational expenditures can be continuously decreased in the name of efficiency and accountability, requiring that schools do more with less (Ambrosino, 2013). The government then blames schools for their inability to meet these seemingly-objective metrics of standardized achievement based solely on schools' use of scarce resources.

Neoliberalism and higher education. Higher education, like the K-12 system, is far from immune to neoliberal policies (Brown, 2015). Within this policy context, students are consumers who make a conscious, rational, and informed decision to participate in higher education and who alone reap the benefits of an education credential (Slaughter & Rhoades, 2004a). Higher education is a good that student-consumers buy and institutions sell, comparable to a car or a computer (Slaughter & Rhoades, 2004b). Neoliberal policies employ market logic to encourage an environment of minimal governmental regulation and financial support for higher education (Ayers, 2005). Rather than the government providing and policing public goods, the market itself oversees the goods (Olssen & Peters, 2005). In this context, the government owes its citizens nothing but optimal free market conditions. Governmental responsibility ceases once it has fostered a free-market environment for its consumer-citizens.

As a result of this governmental posture, funding for higher education has to be scrutinized to ensure its maximally efficient and purposeful use. Two consequences of neoliberalism are the systematic defunding of higher education because of its inability to demonstrate its added value and increasing skepticism that higher education is a public good (Labaree, 1997; Slaughter & Rhoades, 2004a). As Ayers (2005) argues, in a neoliberal system "the discourse of education for participation and leadership in democratic society is overtaken by the economic discourse of production and consumerism" (p. 531). If students are consumers, higher education institutions enter into a business relationship with them and must hold up their end of the contractual bargain by giving students a proper return on their investment through an appropriately valuable product. College ranking systems act as shorthand signifiers for the quality of the product (Brown, 2015; Ordorika & Lloyd, 2015). In neoliberal contexts, higher education only holds value as a product benefitting the individual.

Neoliberal philosophies seep into other areas of life beyond policies and governmental structures (Wilson & Chivers Yochim, 2017). Under neoliberalism, individuals are as unfettered as a

government-made free market can allow to pursue their economic goals. This supposed freedom comes with a tradeoff: individuals are solely responsible for their economic decisions. Life, then, becomes purely economic. All pursuits, whether aesthetic, educational, or familial should be weighed for their economic utility. Through neoliberalism, we are habituated to a set of practices that become compulsions. Neoliberalism extracts who we are alongside our labor. Neoliberal economic systems encourage people to operate in ways that maximize their efficiency and therefore their ability to profit. Without the benefit of any sort of safety net, governmental or otherwise, though, individuals are solely responsible for their economic decisions. Neoliberalism, in the current moment, "increasingly institutes itself as coequal with reality itself, so that as to imagine alternatives is seemingly to lapse into delusion" (De Lissovoy, 2015, p. 31). The COVID-19 crisis illustrates the consequences of framing all actions in purely monetary terms, disguising societal forces like structural racism and the hollowing out of unemployment benefits into one of individual responsibility. Though beyond the scope of this piece, we find it deeply disturbing that workers in sectors such as medicine, public transit, grocery stores, meatpacking plants, and warehouse workers are both deemed to be essential and therefore at a high risk of exposure to the virus; we are not surprised that people of color are disproportionally affected by the crisis (e.g., Centers for Disease Control and Prevention, n.d.). The essential workers' bodies are sacrificed on the altars of capitalism. Under neoliberal logics, those who are suffering the most during the pandemic should have been better economic actors and are to blame for their own pain.

These neoliberal logics extend into higher education and conversations about higher education financing and funding. Economic metaphors abound. Discussions of higher education funding that link the value of higher education—an economic framing—solely with student workforce outcomes reduce the point of a degree to how it can translate into success in the job market—another economic framing. In neoliberal framings, so commonplace as to become unremarkable, the student consumer makes choices in college about what might bring them the most profit, ensuring either economic stability or mobility. Students who choose a degree that might not directly translate to a clear job, like a philosophy major, receive scorn not meted out to the engineer, accountant, or computer science student. The common question, "what are you going to do with that," positions the worth of college education solely on the ability of the credential to grant entry into a labor market characterized by constant precarity. Financial aid for school, then, is similarly considered to be a bet on one's own employability; student debt ought not to be forgiven because the student, as a good, rational, consumer, should have known what they were getting into. Insurmountable debt symbolizes the inability of the indebted to be a savvy consumer. In all of this, higher education is considered to be useful for purely economic ends. We ask, what if the focus of higher education was not on schooling—getting certain grades and therefore a credential—but rather on learning?

With this background in mind, we as scholars, policymakers, and members of the global public should recognize the neoliberal logics underpinning the movements we make towards equity and efficiency in higher education. Policymakers and higher education planners aim for numerical metrics of degree attainment—such as 60% of Texas residents—because they contend that when that is achieved the state's economy will benefit—somehow. Left on the table are questions about what happens for the other 40% of people and whether the hopefully-credentialed 60% are surviving, let along flourishing, a concept we discuss below (Rose, 2010). We must recognize the way that our narrowed frame of university as job-training remains true to the long-held belief that higher education is a private good, which in turn reproduces inequities beyond the university or college. The tendrils of inequality can be found in the housing market, healthcare access, and the environment.

Thinking in New Ways

Despite the infiltration of neoliberal ideas into education, the current policy context is not immutable. Instead of relying on economic metaphors to theorize the purpose of education, we suggest examining education using different lenses and new imaginings. First, we draw from theories of educational flourishing (Allen, 2016; Grant, 2012; Rose, 2010), which honor educational purpose outside the confines of economic returns. Rose (2010) contended that educational flourishing takes place in a context where instrumental or rational understandings of education are valued alongside humane considerations of learning. Grant (2012), drawing on Aristotelian notions of "living well," also employs the language of flourishing, explaining that it "involves people making meaning and sense of important aspects of their life" (p. 914). In her work of educational and political philosophy, Allen (2016) contended that a joint refiguring around the purpose of education must proceed any conversation about education and equality. Relying on the work of John Rawls and Hannah Arendt, she developed a humanistic baseline of educational potential which could develop and support human flourishing.

Allen (2016) divides the goals of education—or the ways of achieving human flourishing—into four potentialities that must be nurtured through education: breadwinning; preparation for civic or political engagement; creative expression; and preparation for rewarding relationships in intimacy and leisure. Importantly, Allen observed that pitting the public good view of education against the private view is not instructional, when one is better served by looking at the two as compatible. She argued: "Each person's individual need to prepare for breadwinning work and for civic and political engagement is simply the other side of the coin of the social need for broad economic competitiveness and an engaged citizenry" (p. 17). These goals frame education as an individual and a communitarian product. While the framework of educational flourishing falls short of revolution, we appreciate the way that it rattles the cage of neoliberal higher education and shakes loose some of the potential in imagining beyond this narrow frame.

Our second lens pushes beyond the binaries of public and private purposes of education, situating educational value in communities, self-determination, and dignity. Tuck (2009) advanced an epistemological shift with the introduction of desire-based research which recognizes that social science pits reproduction against resistance, a fruitless binary that strips individual agency. Within this framework are two concepts we argue can lead to a more fruitful framing of the purpose of higher education as a right rather than a privilege (Harvey, 2008), as holding potential for stewardship rather than accumulation. Educational sovereignty (Tuck, 2011) speaks to the process of individuals and communities exercising self-determination through education. It honors intergenerational relationships and rescinds the authority of the state to confer respect and dignity. Additionally, we can seek out moments of insynchronicity (Tuck, 2010), "the gaps between what institutions, governments, and people say they do and what they actually do—as revealing units of analysis" (p. 644). By using these concepts within a desire-based framework we can engage in work that extends what current research can explain (Tuck & Yang, 2012) and recognize values that individuals place on education outside of individual returns. Through this desire-based lens, we can see the way that in higher education, credentials from accredited institutions hold the power to confer dignity and respect, but the journey to graduation is mired in exploitation and disrespect—for the undergraduates with loans, the graduate research assistants whose labor feeds the machine, and the almost always non-

unionized workers who feed, clothe, and house the students (Magolda, 2016). Whether through demands for unionization, divestment of endowment funds from extractive industries, or the building of new institutions of learning that operate outside of the current system, we see the potential for both insurgent institutional reform and grassroots rebirth.

Indigenous ways of knowing and being that originated in the land known as South America could be helpful in thinking about a more relational, democratic version of higher education. BuenVivir is an indigenous paradigm that sees human and nature as a collectivity and pushes back on linear understandings of progress. It contains "an understanding of human well-being that goes far beyond its material aspect …including collectivity and solidarity as a basis of well-being…" and it "understands nature as the starting and ending point of life itself and understands that humanity has to live in interconnected harmony with this source of life in the achievement of well-being" (Cerdán, 2013, p. 21). Importantly, BuenVivir takes a localized approach to building relationality and collectivity, but does not exclude network building with a broader community. In thinking about how the university can be more relational with less contact, we are excited by examples like the Speculative Education Colloquium, a subversion of university resources towards decolonial and ethnical learning. Powered by Stanford's Zoom and powerful "collective dreaming" (Garcia, 2020), this assemblage generated beautiful ideas about how to value education differently, and itself was a practice, an enactment, of doing that valuing (Booker & Vissoughi, 2020; Yang, 2020).

There are recent movements, both intellectual and activist, which call out these insynchronicities and call for educational sovereignty. In his text, A Third University is Possible, la paperson (2017) advocated for the need to move "beyond the colonial" to the decolonial, which, "requires countering what power seems to be up to" (la paperson, 2017, p. xv). Theories of black fugitivity and the undercommons (Harney & Moten, 2013) reveal the possibility of collective action that forms from the refusal to accept the choices offered by the neoliberal university. Echoing this, students in the Netherlands started their own university, the University of Colour, because their experiences wrestling with the absence of authentic democracy within the University of Amsterdam raised doubts about the ability of a colonial institution to actually decolonize (Awethu!, Blak, van der Scheer, van Meyeren, Martis, & Nam Chi, 2018) and instead re-thought educational practice by creating de-centered, collectivist, unstructured topics of study without grades or teachers, united around learning.

In writing about the death of liberal arts in the university, Stover (2017) concluded that "The humanities and the university do need defenders, and the arts have had advocates as long as they have existed. The way to defend the arts is to practice them" (para. 41). We argue that the best way to make the university different, is to practice difference and remake the university. Harvey (2008), writing more broadly about the modern city, contended that the right to remake is a collective rather than a human right, though we believe his argument applies to the university as well:

> The right to the [university] is, therefore, far more than a right of individual access to the resources that the [university] embodies: it is a right to change ourselves by changing the city more after our heart's desire. It is, moreover, a collective rather than an individual right since changing the [university] inevitably depends upon the exercise of a collective power. (p. 272)

In recent weeks, universities around the country shuttered their campuses because of the threat of a global pandemic. Universities scrambled to shift instruction online, to duplicate digitally their onsite

offerings. Business as usual, but is it? These changes certainly impact students in inequitable ways. We suggest using this time to rethink what higher education can do and who else it can work for.

Conclusion

Neoliberal policies have overtaken higher education, going hand in hand with privatized notions of education as a private good endemic to the system (Labaree, 2016). Though it was a slow process, neoliberalism seems to be firmly embedded in federal and state higher education policies. In neoliberal contexts, the purpose and function of higher education is to create good consumers and workers, with minimal government intervention along the way. The accountability movement in both K-12 and in higher education indicates that education only has value if its worth can be measured in quantifiable outcomes. It is the individual's responsibility to make a rational and informed decision about investing in higher education; the individual alone bears the burden for funding and persisting in order to attain a credential. Neoliberal educational policies do not promote equity and access in higher education because those goals are not concerns of the free market. For example, in neoliberal logic, parents unhappy with the quality of schools in their district could simply exercise their buying power to move away or refuse to participate in a tax system. The free market is supposed to regulate and solve any problems through the logic of competition. Though difficult to achieve, a possible solution can come from using new philosophies of higher education, those that do not depend on instrumental concepts and instead encourage educational sovereignty and insynchronicity, leaving room for alternate understandings of what education can do and means. We are living in a time when neoliberalism—built on the economic and seeping into the fabric of who we are—is consuming itself—consuming us. The current crisis could be a trial run for imagining what higher education can look like in a new moment.

Around the globe, people are asking questions about what we can learn from the pandemic and observing what the pandemic is doing to our world. The air is clearer and pollution has dropped because humans have stopped moving around as much (de Sousa Santos, 2020). With conflicting messages about social distancing from federal, state, and local governments, citizens who (can and do) choose to stay home are exercising a biopolitics from below (Sotiris, 2020), governing themselves in communitarian interests. We ask, what can the pandemic teach us about possible rethinkings of the university. Just over a decade ago, the financial crisis—again, framed economically but with devastating impacts on human lives and the environment—slashed funding for higher education. Public universities have not yet reached levels of pre-2008 funding today (Mitchell, Palacios, & Leachman, 2015). In this pandemic, however, schooling is impacted in a specific way that it was not in 2008. Education did not change in its most basic forms in 2008. And education may not change fundamentally now, but we are in an ideal moment to look under the hood, to question what is really happening—or could be happening—in education.

If neoliberal logics are taken to their extreme and higher education is a purely economic exchange, are institutions engaging in competitive pricing to offer the best credential for the lowest price and minimal effort for the consumer? If education is more than that, what exactly are institutions offering? If institutional leadership finds those questions inopportune, perhaps they should think deeply about purposes outside of neoliberal constructions. Perhaps the shifts in the modality of higher education could lead to further thought about what education looks like, quite literally, beyond the classroom and the credentialing accoutrement of the neoliberal moment. What if the purpose of education is learning?

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The State of School Segregation in Texas and the Factors Associated with It

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School Segregation Harms Children of Color

In 1957, a group of nine Black teenagers bravely confronted the Arkansas National Guard, which blocked them from entering their recently integrated high school after Brown v. Board of Educ., 347 U.S. 483 (1954). The standoff ended only after President Eisenhower ordered federal troops to escort these students into their school (Fitzgerald, 2007). By refusing to be turned away from their rightful place in an integrated school, the children became known as the "Little Rock Nine." They pushed the United States to honor the constitution's equal protection clause enshrined in the 14th amendment. Furthermore, their stoic steadfastness in the face of racial hatred provided future civil rights leaders a powerful image of justice to evoke and remind the public of this nation's promise to treat all people equally, especially in education through desegregation. Unfortunately, since the 1970s, desegregation efforts failed to keep the promise of equality in the 14th amendment. Desegregation efforts stalled in the past three decades, even as the percentage of Black and Hispanic students around the country increased dramatically (Reardon & Owens, 2014). Consequently, according to Reardon & Owens (2014), students of color in high poverty schools—one measure of segregation—was highly segregated in 2016 with 46.6% of students of color in high poverty schools compared to 8.3% of White students.

As a result of these disappointing desegregation outcomes, Black and Hispanic children in segregated schools suffer academically. According to Condron et al. (2013), Black and Hispanic children who attend segregated schools have poorer academic outcomes than those from more integrated schools. These researchers used multiple regression analysis in their study of 4th grade scores from the National Assessment of Educational Performance (NAEP) and found a strong negative relationship between school segregation and NAEP scores in both reading and math. Hanushek et al. (2009) found similar results in a study using stacked panel data from Texas that measured the current and cumulative past inputs to student achievement, including segregation. They determined these negative effects of segregation were much more pronounced for Black versus Hispanic students. Condron et al. (2013) argued that segregated Black and Hispanic children earn lower standardized test scores because their schools received fewer state and local resources than integrated schools. Another concern raised regarding race-based school segregation is school funding. Public school funding comes from property tax revenue, which is higher in White, property-rich neighborhoods (Bischoff & Reardon, 2014). Kreisman and Steinberg (2019) provide evidence of the relationship between school funding and student achievement using data from Texas. They found that a $1,000 increase every year in foundation funding is associated with a 0.1 standard deviation increase in reading scores and a 0.08 increase in math (Kreisman & Steinberg, 2019).

Investigating school segregation by race and ethnicity in Texas is critical when considering the state's demographics and past reports on school segregation. Texas public schools are becoming increasingly Hispanic with every passing year (Musgrave, 2019). Orfield et al. (2016) pointed out that as the Hispanic population grows, Texas consistently ranks as the third most segregated state by ethnicity nationwide. This researcher determined the level of segregation by using an exposure index that measures Hispanic students' exposure to white children. By contrast, according to the Texas

Education Agency (2020), the statewide percentage of black public-school students has remained steady over the past five years. However, Orfield et al. (2016) reported that black student is the second-highest in the country using the same exposure index.

This study investigated school segregation by race and ethnicity in Texas and tackled the following research questions:

1.) What is the current state of school segregation by race and ethnicity in Texas, and how does it differ between public charter and traditional public schools?

2.) What factors are associated with variations in segregation in Texas public schools?

One goal of this research was to examine school segregation by race and ethnicity in Texas. This will help Texas voters and lawmakers decide whether further actions are necessary to decrease school segregation. Additionally, I tested for the existence of relationships that past researchers uncovered between various factors and school segregation by race and ethnicity. Understanding associated factors could help researchers who study segregation explain the conditions under which these relationships do not exist.

This paper starts with a brief overview of the history of segregation through the lens of critical race theory. Next, a literature review is provided, which discusses the factors that past researchers have found to be associated with school segregation by race and ethnicity. The paper then includes segregation measurement and methodology sections, which review methods used to measure school segregation. This paper subsequently reports results on school segregation in Texas and analyzes study findings.

Brief History of School Segregation

When Dr. Martin Luther King Jr. delivered his "I Have a Dream" speech in 1963 at the March on Washington for Jobs and Freedom, his words stirred support among the American public for racial equality and integration. He delivered his speech 73 years after the United States passed the Morrill Act in 1890, which banned new land-grant colleges from using race as an admissions criterion (Boucher, 2017). Dr. King's speech also took place 9 years after Brown v. Board of Educ. (1954), which declared that de jure segregation of Black and Hispanic students was a violation of the Equal Protection Clause of the Fourteenth Amendment (Brown v. Board of Educ., 1954). Soon after Dr. King's speech and amidst a national civil rights movement, President Johnson signed the 1964 War on Poverty Act and the 1965 Elementary and Secondary Education Act, two pieces of legislation which increased education and social safety net funding for low-income students and families (Zeitz, 2019). Brown v. Board of Educ. (1954) and Dr. King's speech were turning points that rebuked a long history in America of white supremacy and discrimination that falsely characterized Black and Hispanic students as inferior and subhuman (Hasian, 1996). However, these events were not the only pivotal strides in history to end school segregation. One pivotal court case successfully challenged the segregation of Hispanic students prior to 1954. In Mendez v. Westminster School District of Orange County (1947) the United States Court of Appeals for the Ninth Circuit ruled that children of Mexican descent could not be segregated into separate schools because Mexicans are White. In this case, the court also rejected schools' official justification for segregating over 90% of Texas Hispanic students—that they would get better language support in segregated environments (Heilig & Holme, 2013).

In the decade following Dr. King's famous speech, many districts integrated their schools to varying degrees, voluntarily and by state or local order (Schertzer & Walsh, 2019). Yet, for decades after these court decisions, most Black and Hispanic students still attended majority-minority schools (Thompson Dorsey, 2013). To avoid school integration, many White families moved their children out of integrated districts. Over time, this White flight accounted for up to 60% of segregation between schools (Schertzer & Walsh, 2019). As a result, white flight seriously undermined desegregation efforts.

Desegregation efforts then weakened even further due to a series of crucial court cases. The all-White Supreme Court decided in Milliken v. Bradley (1974) that federal courts could not force school districts to be a part of a desegregation order unless there was evidence of equal protection violations (Reardon & Owens, 2014). In addition, in Board of Education in Oklahoma City Public Schools, Independent School District No. 89 v. Dowell (1991), the Court ruled that a school that had eliminated de jure segregation would no longer require desegregation supervision by the district courts (Reardon & Owens, 2014). In Freeman v. Pitts (1992), desegregation efforts weakened even more, when the majority-White Supreme Court established six "Green Factors" that permitted school districts to claim the elimination of de jure and de facto segregation if they addressed five of the six factors. These factors included the integration of the following: student demographics, faculty demographics, staff assignment, transportation, extracurricular activities, and facilities (Thompson Dorsey, 2013). Therefore, schools could claim that they eliminated segregation even though they had not fully integrated Black and White students (Thompson Dorsey, 2013; Wilson, 2016).
In Texas, during the years after Brown v. Board of Educ. (1954), the courts placed 60 school districts under integration orders. And as of 2014, twenty-four desegregation orders were still in place despite the existence of the Supreme Court's Green Factors. Reardon & Owens (2014) argue that school segregation by race and ethnicity still persists in Texas. They indicated minority students in high poverty schools—one measure of segregation—was highly segregated in 2016 with 46.6% of students of color in high poverty schools compared to 8.3% of White students. Furthermore, Heilig & Holme (2013) found that Hispanic students in Texas were highly segregated based on ethnicity, poverty, and language ability (Heilig & Holme, 2013).

Literature Review

The history of segregation in the United States provides an essential backdrop to the literature discussing five main factors associated with school segregation by race and ethnicity. These five factors are residential segregation, socioeconomic status, school accountability scores, school safety, and charter schools. Each factor will be discussed in greater detail.

Residential Segregation

Past studies indicated that school segregation is positively associated with patterns of residential segregation (Frankenberg, 2013; Orfield, 1985). As residential areas become more diverse, so do demographics in schools. For instance, in Frankenberg's (2013) study on the relationship between residential and school segregation, the researcher examined dissimilarity indices for residential and school segregation in 362 major metropolitan areas from the U.S. Census and National Center for Education Statistics from 2000 to 2012. Dissimilarity indices showed that segregation increased with higher levels of dissimilarity between neighborhood and school (Frankenberg, 2013). Using regression analysis, Frankenberg found that every one index point increase in residential segregation was

associated with a one index point rise in school segregation. However, when she disaggregated her data by state, she noticed that this relationship was slightly weaker in southern states compared to the northern states. The relationship was also weaker when analyzing Hispanic students only (Frankenberg, 2013).

Frankenberg's (2013) work reinforced what Orfield (2013) argued for decades that segregated schools were linked to segregated neighborhoods. Orfield (2013) indicated that starting in the 1960s, states began to push municipalities to implement integration mandated by Brown v. Board of Educ. (1954). Many states and municipalities complied by decoupling school attendance zones from neighborhoods, which were highly-segregated. However, Orfield (2013) pointed out that the following Supreme Court decisions weakened the decision in Brown v. Board of Educ. (1954): Milliken v. Bradley (1974), Board of Education in Oklahoma City Public Schools, Independent School District No. 89 v. Dowell (1991), and Freeman v. Pitts (1992). As a result, schools started to become just as segregated as neighborhoods (Orfield, 2013).

Socioeconomic Status

Previous research also indicated that school segregation is negatively associated with socioeconomic status because income determines what housing people can afford and therefore influences residential segregation. Iceland and Wilkes (2006) conducted a study to determine the relationship between socioeconomic status and residential segregation using multivariate analysis on data from the United States Census Bureau on 331 American metropolitan areas between 1990 and 2000. These researchers determined that socioeconomic status had a strong negative association with residential segregation, especially for Hispanic people (Iceland & Wilkes, 2006). Bischoff and Reardon (2014) conducted a similar study on 117 American metropolitan areas between 1970 and 2009 using the United States Census Bureau data. They found a strong positive relationship between income inequality and residential segregation. This means that as income inequality increased, so did residential segregation and, therefore, school segregation. They also found that this residential segregation was most significant among Black and Hispanic people (Bischoff & Reardon, 2014).

School Accountability Scores

Some past studies have uncovered a positive relationship between accountability scores and school segregation. For instance, Davis et al. (2015) conducted a study to determine the relationship between accountability regimes created under the No Child Left Behind (NCLB) Act and school segregation. These researchers conducted multiple regression analysis using 1987-2011 data from the annual Common Core Data (CCD) census along with enrollment and population data from the United States Census Bureau. They determined that Black-White school segregation increased with the passing of NCLB and that these segregation effects were the strongest in states that had preexisting accountability regimes. They attribute this increase in segregation to White parents moving their children to whiter schools with higher accountability ratings (Davis et al., 2015).

Heilig and Holme (2013) conducted a similar study to determine the relationship between school accountability rating and segregation by race and ethnicity. They conducted logistic regression using 2011 data from the United States Census Bureau and 2011 accountability ratings data from the Texas Education Agency. They found a strong negative association between school accountability rating and segregation by race and ethnicity, especially Hispanic students (ELLs; Heilig & Holme, 2013).

School Safety

Researchers use the term school safety in a variety of ways. For instance, Lenzi et al. (2017) used a broad definition of school safety in their study of 49,638 California students ages 10 to 18 participating in the 2010–2012 California Healthy Kids Survey. These researchers defined school safety as the absence of bullying, fighting, and violent crime. They also included in their definition of psychological safety when, for instance, students earn bad grades (Lenzi et al., 2017). By contrast, our definition of school safety aligns with Mayer and Jimerson (2018), who framed the concept within a discussion of school violence. These researchers presented models for the prevention, identification, and eradication of violence in schools (Mayer & Jimerson, 2018).

Past studies also showed a negative relationship between school violence and segregation of students by race and ethnicity. For example, Eitle and Eitle (2003) conducted a study using 1999-2000 data from the Florida Department of Education on student enrollment and violent incidents in 67 urban and suburban school districts. They also used county demographics data from the United States Census Bureau. These researchers conducted multiple regression analyses, using two segregation indices (dissimilarity and racial inequality) for the independent variables and incidences of school violence for the dependent variable. Meanwhile, they controlled for school characteristics. Eitle and Eitle (2003) found a negative relationship between school segregation and violence and a positive relationship between racial inequality and violence.

Eitle and Eitle (2003) use social strain and social control frameworks to explain their findings. Social strain occurs when different races and ethnicities mix, and hostility or stereotyping ensues, putting a strain on social relationships. The social control framework indicates that people who experience the indignities associated with racial inequality come to distrust the education system, including school rules. As a result, they commit more violent offenses (Eitle & Eitle, 2003). Several studies in the past tested social strain and social control theories. Most recently, Paez (2018) studied cyberbullying within the framework of social strain theory. Cyberbullying involves harassing and demeaning emails, text messages, and social media posts (Paez, 2018). Paez (2018) used data from the 2009/2010 Health Behavior in School-Aged Children (HBSC) study and conducted a multivariate logistic regression analysis to identify significant factors associated with engagement in cyberbullying. Results show that students who experienced strain engage in cyberbullying (Paez, 2018).

Charter Schools

Past research presents mixed results on the relationships between charter schools and school segregation. Wilson (2019) argued that charter schools are the new driver of school segregation in the United States. She argues that predominantly-White charter schools are creating enclaves where White parents can segregate their children from students of color (Wilson, 2019). Furthermore, Kotok et al. (2017) conducted a study in Pennsylvania that revealed the transfers of Black and Latino students from traditional public to charter schools tended to create higher levels of segregation. Stein (2015) conducted a similar study in Indianapolis and found that the introduction of school choice in charter schools increased levels of racial isolation. However, unlike in Pennsylvania charter schools, segregation as racial isolation occurred in Indianapolis, because White families tended to choose schools with higher percentages of White students.
By contrast, Rapp and Eckes (2007) studied data from 32 states and found that charter schools were slightly more segregated, but were not actively segregating students. These researchers demonstrated

that segregation in charter schools resulted from parent choice, a lifting of mandatory desegregation orders, and the language in statutory requirements for charter schools. Furthermore, Mickelson et al. (2018) and Jacobs (2011) argue that charter schools mirror community segregation and parent preferences for neighborhood schools, which perpetuates historical segregation by race and ethnicity. Vasquez Heilig et al. (2016) argued that some charter schools in Texas actually chose specifically to open in and serve these specific residentially segregated communities.

Finally, Abioye (2019) points out that the charter school movement for accountability and social justice began as early as 1990 in West Oakland, California, which was an epicenter of the Black Panther Party and civil rights movements. The author indicates that the two charter schools that opened there had a majority-Black student population, faculty, and leadership, which was a source of pride. According to Abioye (2019), these two schools were gathering places that strengthened the African American community (Gintis, 2012).

Methods and Data Source

In this section, we begin with a description of measuring school segregation. As Reardon and Owens (2014) indicate, a researcher's choice of segregation measurement has a major impact on their perception of it. After discussing segregation measurement, we explain our statistical methods and data sources.

Measuring Segregation

Some researchers conceive of segregation as separateness and measure it by the degree of isolation one group has from another (Massey & Denton, 1988; Orfield, 2001). These researchers would consider a school with 97% Hispanic students ethnically segregated because the student body is almost completely isolated from non-Hispanic children. Other researchers view segregation as unevenness between groups (James & Taeuber, 1985; Massey & Denton, 1988). They accordingly would consider a school segregated if its student demographics diverged from the racial and ethnic makeup of other schools in and out of the district, or if these demographics diverged from those of the community (i.e., county, city or zip code). These two different views of segregation have led to the development of 20 varying indices (Frankel & Volij, 2010). And as Kotok et al. (2017) point out, researchers could use these 20 indices to reach several different conclusions about levels of segregation in Texas.

Reardon and Owens (2014) indicate that there is no "correct" way to measure segregation. The choice of measurement depends on whether researchers focus on the peer effects or compositional effects of segregation (Reardon & Owens, 2014). Peer effects result from the transfer of achievement norms that occur in integrated schools from White to non-White students (Reardon & Owens, 2014). Researchers who focus on peer effects use isolation metrics that measure exposure to White students. For example, Fiel (2013) conducted a study on school segregation using 1993 to 2010 national data from multiple sources and determined that Black isolation decreased by 6.3% while Hispanic isolation increased by 7.6%. He argues that Hispanic isolation increased because of population changes. Furthermore, Siegel-Hawley & Frankenberg (2012) found that isolation of Black students from their White peers increased in many southern metropolitan areas by up to 10% in the ten years leading up to 2009.

By contrast, researchers who focus on compositional effects measure segregation using unevenness metrics. For example, the Atkinson Index measures within-district segregation by subtracting the sum, over all schools in a district, from some weighted geometric average of the percentages of each group who attend the school (Frankel & Volij, 2010). These weights are nonnegative and add up to one, e.g. 1-(.5)^a (.2)^b- 〖(.5)〗 ^a 〖(.8)〗 ^b where .5 and .2 are a school's racial or ethnic demographics. The variables a and b are the weights that add up to 1. These weights account for the relative sizes of schools within a district (Frankel & Volij, 2010).

Conger (2005) conducted a study on school segregation of New York City elementary students focusing on compositional effects. He used data from 1995-1996 and 2000-2001, and a measurement called the Segregation Index, which is a measure of demographic unevenness. He determined that the segregation of Black students stood at 45%, and the unevenness of Hispanic students was 32%. These percentages indicated the racial and ethnic segregation in New York City elementary schools, with 100% being the maximum level of segregation and 0% being the minimum, meaning schools were completely integrated (Conger, 2005). We provide this context for 45% and 32% because the meaning of percentages can vary by different types of segregation measurement.

This study measures segregation as unevenness rather than isolation and exposure for a couple of reasons. First, van Ewijk and Sleegers' (2010) meta analysis of many school segregation studies indicates that peer effects on student achievement are generally small and vary greatly by race and ethnicity. As a result, the isolation and exposure metrics concerned with peer effects do not measure the most critical aspects of school segregation. Second, as Schaeffer (2019) from the Pew Research Center reported, Texas is second only to California in the number of counties that have become majority non-White in the past two decades due to a birth rate that is higher for Hispanics than for White people. Schaeffer (2019) predicted that the trend will continue and suggested that schools in these increasingly non-White counties could become more racially and ethnically isolated as the proportion of White students decreases. Therefore, isolation and exposure metrics would actually be measuring demographic changes unrelated to traditional segregation caused by White flight or zoning policies.

Furthermore, the methods in this study differ from the 20 segregation indices Kotok et al. (2017) described. Those 20 indices measure unevenness through demographic composition differences between schools within a district or between districts, in contrast to our methods measuring compositional differences between a school and a distinct geographic area (Frankel & Volij, 2010). As a result, our methods did not require adjustment for relative school sizes within a district, unlike the Atkinson Index, because we compared school demographics to those of a geographic area. We measured segregation of Black students—in both traditional public and public charter schools—by subtracting the percentage of Black students for each school from the percentage of Black people in each campus' respective zip code. We then took the absolute value of the difference. For instance, if a school had a student population that was 10% Black and the campus zip code was 50% Black, then the school's level of segregation was 40%. A 0% would mean that a school's Black population mirrors neighborhood demographics, and therefore has no segregation. Using these methods, segregation could be as large as 100%, depending on the relative makeup of school and zip code populations. We used the same methods for measuring segregation of Hispanic students.

We separated Texas school districts by school type to conduct our statistical analysis and modeling. We used a dummy variable, coding traditional public schools as "0" and open-enrollment public

charter schools as "1." As described in Chapter 11 of the Texas Education Code, traditional Texas public schools are part of the independent school districts that have existed in the state since the late 1800s. Open-enrollment charter schools are part of open-enrollment charter districts, which the Texas Legislature created in 1995 as a part of Senate Bill 1. According to Chapter 12 of the Texas Education Code, these open-enrollment charter districts include traditional campuses, dropout recovery schools, and residential treatment centers. Open-enrollment charter schools do not include virtual campuses or private tuition-based schools. Open-enrollment charters also do not include home-rule charters described in Chapter 12 of the Texas Education Code or district-charter partnerships created as a part of Senate Bill 1882 in the 85th Texas Legislative Session.

We separated our segregation data by charter versus traditional public schools, because there are few important systematic differences between these school types in Texas that could lead to different levels of segregation. First, according to the first section in Chapter 12 of the Texas Education Code, one of reasons the Texas Legislature created public charter schools was to improve student achievement by providing school choice to students in failing schools. Many failing schools in Texas are majority-minority (Sepulveda, 2019). Therefore, one of public charters' priority populations by default are Black and Hispanic students (Vasquez Heilig et al., 2016). Second, some public charters were founded to cater to specific racial, ethnic and cultural demographics (Vasquez Heilig et al., 2016). Third, public charters in Texas a percentage of teachers of color that is two times that of traditional public schools, which could attract more families of color (Texas Education Agency, 2020).

Statistical Analysis and Models

After measuring Black and Hispanic segregation by school type, this study involved descriptive statistics for each independent and dependent variable in its sample of Texas school districts, e.g. the sample size, mean, standard deviation, the minimum, the maximum and skewness. The study then involved a pair of two-sample t-tests in determining how segregation differs between public charter and traditional public schools. The first t-Test included the segregation measurements of Hispanic students in charter versus traditional public schools. The second t-Test included segregation measurements of Black students in charter versus traditional public schools.

Last, two rounds of multiple regression analyses were conducted to determine which factors were associated with Black and Hispanic segregation. Independent variables in the first and second round included the following: % EcoDis Students; Accountability Score; Safety Funding Per Pupil; and Charter Schools. We used the following variables to control for community and school characteristics: % Black by Zip Code; % Hispanic by Zip Code; % White by Zip Code; % White Teachers; Discipline Students; Enrollment Size; and Median Income. The dependent variable in this first round was segregation of Black students, and the dependent in the second round was segregation of Hispanic students. The multiple regressions were conducted in SPSS using the listwise function to achieve the largest possible effect size. We hypothesized that these two rounds of multiple regression analysis would generate statistics to enable us to build the following two equations to estimate segregation of Black students (a) and Hispanic students (b).

$$BlackSeg=B_0+B_1\cdot\%\ Black\ by\ Zip\ Code+B_2\cdot\%\ Hispanic\ by\ Zip\ Code+B_3\cdot\%\ White\ by\ Zip\ Code+B_4\cdot\%\ White\ Teachers+B_5\cdot\%\ EcoDis\ Students+\ B_6\cdot Discipline\ Students+B_7\cdot Accountability\ Score+B_8\cdot Enrollment\ Size+B_9\cdot Safety\ Funding\ Per\ Pupil+B_10\cdot Median\ Income+B_11\cdot Charter\ School+U$$

HispSeg=B_0+B_1·% Hispanic by Zip Code+B_2·% Black by Zip Code+B_3·% White by Zip Code+B_4·% White Teachers+B_5·% EcoDis Students+ B_6·Discipline Students+B_7·Accountability Score+B_8·Enrollment Size+B_9·Safety Funding Per Pupil+B_10·Median Income+B_11·Charter School+U

In regression equations (a) and (b), B_0 is the intercept constant, U is the error term and B_i are the coefficients estimated in the regression analysis for each independent variable. Estimated coefficients represent the predicted change in BlackSeg and HispSeg for a one-unit change in the independent variables. These estimated coefficients—including their standard errors, standardized coefficients, t-statistics, and p-values—appear in Tables 1 and 2 in the Appendix.

Data Sources for Study

The 2018 school enrollment rates for calculating the segregation of Black and Hispanic students came from the Texas Education Agency's (TEA's) 2018 PEIMS (Public Education Information Management System) Standard Reports. The United States Census Bureau's American Community Survey provided 2018 population rates for Hispanic and Black people by zip code and county, in addition to 2018 data on median income. Finally, school-level datasets for the following came from the TEA's 2018 Texas Academic Performance Reports: the percentage of economically disadvantaged students, the percentage of White teachers, the percentage of students in the discipline population, school accountability scores, and safety and security funding per pupil.
The study sample included 6,089 schools. Because a random sample of data by zip code from the American Community Survey was used, the 6,089 sample of schools was the result of a probability sample that is generalizable to the population of schools in Texas.

Results

After conducting the pair of two-sample t-tests, we determined that the mean levels of segregation of Black students in public charters and traditional public schools were 10% to 7%, respectively. We found a statistically significant difference between these means at a 0.05 alpha level, meaning that segregation of Black students was slightly higher than in public charter schools. By contrast, the average levels of segregation of Hispanic students in public charters and traditional public schools were 16% to 15%, respectively, which was not a statistically significant difference at a 0.05 alpha level.

Factors Associated with Segregation of Black Students

Table 1 in the Appendix presents results from the second multiple regression analysis, the beta coefficients of which constitute the regression model. According to the standardized beta coefficients β column, % Black by Zip Code had the strongest positive relationship to segregation of Black students. Every 1% increase in % Black by Zip Code was associated with a 0.18% increase in segregation of Black students. The % EcoDis Students had the second strongest positive relationship to the segregation of Black students. Every 1% increase in % EcoDis Students was associated with a 2.4% increase in segregation of Black students.

Three variables with the strongest negative relationship to segregation of Black students include the following: % Hispanic by Zip Code, % White Teachers, and the Enrollment Size. The five remaining variables—% White by Zip Code, Accountability Score, Safety Funding Per Pupil, % White Teachers, and Charter School—had the weakest (but still statistically significant) negative

relationship to segregation of Black students. Every 1% increase in % Hispanic by Zip Code was associated with a 0.082% decrease in Black segregation. Every 1% increase in Accountability Score was associated with a 0.002% decrease in Black segregation. Every 1% increase in Safety Funding Per Pupil was associated with a 0.005 decrease in Black segregation. Every 1% increase in % White Teachers was associated with a 5% decrease in Black segregation.

BlackSeg=B_0+0.18·% Black by Zip Code-0.082·% Hispanic by Zip Code-4.087·% White by Zip Code-0.046·% White Teachers+2.358·% EcoDis Students-0.033·Accountability Score-0.002·Enrollment Size-0.005·Safety Funding Per Pupil+1.648·Charter School+U

Factors Associated with Segregation of Hispanic Students

Table 2 in the Appendix presents results from the first multiple regression analysis modeling segregation of Hispanic students. The values in column B are the beta coefficients in the regression model. According to the standardized beta coefficients in the column labeled β, the four beta coefficients with the strongest relationship to Hispanic segregation include the following: % EcoDis Students, % Hispanic by Zip Code, % Black by Zip Code and % White by Zip Code. Because the coefficient for % EcoDis Students is positive, it is positively associated with Hispanic segregation. For every 1% increase in % EcoDis Students, segregation of Hispanic students increased by 17%. By contrast, % Hispanic by Zip Code, % Black by Zip Code and % White by Zip Code was negatively associated with Hispanic segregation. Every 1% decrease in Hispanic students was associated with 0.24% decrease in Hispanic segregation. Every 1% decrease in White students was associated with a 0.09% decrease in Hispanic segregation. And every 1% decrease in Black students was associated with a 0.20% decrease in Hispanic segregation.

Discipline Students, Accountability Score, Enrollment Size, and % White Teachers also had negative beta coefficients, meaning that they were negatively associated with Hispanic segregation. Every 1% increase in Discipline Students was associated with a 3.5% decrease in Hispanic segregation. And every 1% increase in Accountability Score was associated with a 0.05% decrease in Hispanic segregation. Every school enrollment increase of 1 student was associated with a 0.002% decrease in Hispanic segregation. Finally, every 1% increase in % White Teachers was associated with a 0.09% decrease in Hispanic segregation.

Based on this multiple regression analysis, we modified our hypothesized model from the methodology section to the following:

HispSeg=B_0-0.242·% Hispanic by Zip Code-0.201·% Black by Zip Code-9.119·% White by Zip Code-0.089·% White Teachers+17·% EcoDis Students -3.492·Discipline Students-0.052·Accountability Score-0.002·Enrollment Size+U

Discussion

Results from this study provide evidence to support claims by Reardon and Owens (2014) and others that segregation of Black and Hispanic students still exists in Texas public schools. However, we measured segregation as unevenness metrics by examining the difference of demographic compositions between school and zip code. The findings in this study suggest that school segregation is less severe than indicated in studies that measure segregation using isolation metrics. Furthermore, contrary to previous studies by Conger (2005) and others, the average segregation of Hispanic students

was higher than the segregation of Black students. Finally, results were just as mixed as previous studies on the differences of segregation by school type. Segregation exists in both traditional public and public charter schools, but Black students are slightly more segregated in charters.

Factors Associated with Segregation of Black Students

The studies reviewed in the literature indicated that socioeconomic status, school safety, and charter schools should be positively associated with the segregation of Black students. The literature review further indicated that school accountability scores should be negatively associated with the segregation of Black students. Our study results provide evidence to confirm the positive association between socioeconomic status, school safety, and charter schools and school segregation of Black students. Our study results also provide evidence to support a negative association between school safety and the segregation of black students. The coefficients for % EcoDis Students and Charter Schools were positive, but the coefficients for Accountability Score and Safety Funding Per Pupil were negative.

Factors Associated with Segregation of Hispanic Students

The literature review indicated that socioeconomic status should be positively associated with the segregation of Hispanic students. The results of this study confirm findings from Iceland and Wilkes (2006) and Bischoff and Reardon (2014) because the coefficient for % EcoDis Students was positive. The literature review furthermore indicated that school safety and charter schools should be positively associated with the segregation of Hispanic students. However, our study results only provide evidence of negative associations between school accountability scores and the segregation of Hispanic students. The coefficient for the Accountability Score was negative. However, in our model, a 1% increase in the segregation of Hispanic students would be associated with a 20% decrease in accountability score, which is equivalent to a drop of 2 letter grades in the Texas A – F system. Alternatively, a 1% decrease in the segregation of Hispanic students would be associated with a 20% increase in the Accountability Score. Therefore, we should not expect to see monumental changes in the segregation of Black students in the presence of radically changing accountability scores.

By contrast, our study results do not provide evidence for negative associations between the segregation of Hispanic students and the factors Median Income and Charter School. These two factors did not end up in our final regression model because they were not statistically significant. One possible reason for the statistically insignificant relationship between Safety Funding Per Pupil and the segregation of Hispanic students is that the relationship between violence and integration that Eitle and Eitle (2003) discuss may look different for the integration of Hispanic versus Black students. This is an area that requires more research. A possible reason for the statistically insignificant relationship between Charter Schools and the segregation of Hispanic students is the pervasiveness of Hispanic segregation of all public schools, including traditional public campuses. The t-test we conducted in this study, finding no statistically significant difference in the segregation of Hispanic students, supports this explanation.

Conclusion

Over sixty years ago, the Supreme Court ordered United States schools to desegregate. The Little Rock Nine and others then fought resistance to integration for many years after the Court's

decision. And only by the 1970s did hundreds of the most resistant school districts nationwide began to integrate after the Court ordered them to implement desegregation plans. The Little Rock Nine pushed the United States to honor the constitution's equal protection clause enshrined in the 14th amendment. Furthermore, their steadfastness provided future civil rights leaders a powerful image of justice to evoke and remind the public of this nation's promise to treat all people equally, especially in education through desegregation. However, desegregation efforts have stalled in the past three decades, even though the population of Black and Hispanic students nationwide has increased dramatically (Reardon & Owens, 2014).

This study investigated the current state of school segregation by race and ethnicity in Texas, and how it differs between public charter and traditional public schools. We also investigated the factors associated with variations in segregation in Texas public schools. Additionally, this study offers new insights on some differences in the segregation of Hispanic students, which were not discussed in past research. Therefore, researchers must study these differences in more depth. It is also important for the public and their lawmakers to consider these differences when making decisions about future efforts to further desegregate Texas public schools.

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Appendix

Table 1

Results from Multiple Regression Analyses, Dependent Variable "Segregation of Black Students"

Independent	B	SE B	β	t	p
% EcoDis Students	2.358**	0.531	0.071	4.44	0.000
% Black by Zip Code	0.18**	0.016	0.281	11.46	0.000
Enrollment Size	-0.002**	0.000	-0.114	-9.8	0.005
% Hispanic by Zip Code	-0.082**	0.007	-0.230	-12.08	0.000
% White Teachers	-0.046**	0.006	-0.142	-7.5	0.000
Charter Schools	-1.648**	0.361	-0.055	-4.56	0.002
% White by Zip Code	-4.087**	1.289	-0.072	-3.2	0.007
Accountability Score	-0.033**	0.012	-0.034	-2.73	0.000
Safety Funds Per Pupil	-0.005*	0.002	-0.027	-2.13	0.034

Note. The *N* in this multiple regression was 6,087 and the effect size of model including all independent variables was 0.257 or 25.7%. EcoDis = Economically Disadvantaged.

* The single asterisk * and double asterisk ** indicate that the unstandardized coefficient was statistically significant at the 0.05 and 0.01 levels of alpha, respectively.

Table 2

Results from Multiple Regression Analyses, Dependent Variable "Segregation of Hispanic Students"

Independent	B	SE B	β	t	p
% EcoDis Students	16.923**	0.79	0.376	21.43	0.000
Median Income	0.0000643**	0.000	0.054	2.79	0.005
% Hispanic by Zip Code	-0.242**	0.012	-0.499	-20.05	0.000
% White Teachers	-0.089**	0.009	-0.199	-9.85	0.000
% Black by Zip Code	-0.201**	0.026	-0.226	-7.85	0.000
Enrollment Size	-0.002**	0.000	-0.066	-5.40	0.000
% White by Zip Code	-9.119**	1.926	-0.118	-4.73	0.000
% of Discipline Students	-3.492**	0.906	-0.047	-3.86	0.000
Accountability Score	-0.052**	0.018	-0.039	-2.94	0.003

Note. The *N* in this multiple regression was 6,087 and the effect size of model including all independent variables was 0.168 or 16.8%. EcoDis = Economically Disadvantaged.

* The double asterisk ** indicates that the unstandardized coefficient was statistically significant at the 0.01 level alpha.

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Using the Technology Acceptance Model to Analyze K–12 Students' Behavioral Intention to Use Augmented Reality in Learning

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Using the Technology Acceptance Model to Analyze K–12 Students' Behavioral Intention to Use Augmented Reality in Learning

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Augmented Reality (AR) has gained popularity in K-12 education in the past decades (Bower et al., 2014; Dunleavy & Dede, 2014; Dunleavy et al., 2009; Leighton & Crompton, 2017). Researchers and educators agree that AR is a useful pedagogical tool in teaching because it is grounded on efficient teaching and learning models such as constructivist learning (Abdoli-Sejzi, 2015), situated learning (Liarokapis et al., 2004), and inquiry-based learning (Chiang et al., 2014). Research on AR in the K-12 context tends to focus on its impact on students' learning processes and learning outcomes (Calle-Bustos et al., 2017; Chang et al., 2016; Freitas & Campos, 2008; Wu et al., 2013). However, it is essential to understand K-12 students' behavioral intention to use AR—their perceptions of usefulness, ease of use, and enjoyment—so that teachers can better design and integrate AR-based learning into their courses. After defining AR in education, this literature-based research explores K-12 students' behavioral intention to use AR in learning guided by the Technology Acceptance Model. Specifically, we aim to answer this research question: What is K-12 students' behavioral intention to use AR-based learning in real classrooms?

(Re)defining Augmented Reality

AR has been defined differently from different perspectives. Our literature review demonstrates that there are at least three different approaches to defining AR. First, AR was defined in a very general and broad sense, focusing on the blending of the virtual and the real. Azuma (1997) conducted a survey of the applications of AR in a wide range of areas and industries including medical, manufacturing and repairing, annotation and visualization, robot path planning, entertainment, and military aircraft in order to describe AR's characteristics. Based on that survey, Azuma (1997) defined AR as systems that have three characteristics "1. Combines real and virtual; 2. Interactive in real time; 3. Registered in 3-D" (p. 356). He provided an example of such a combination of the real and the virtual by demonstrating a real desk with a 3-D virtual lamp on it and two virtual chairs around the desk in a real room. These three characteristics have become the foundation for later researchers to define AR. For example, Furht (2011) conceptualized AR as a technology that "augments the sense of reality by superimposing virtual objects and cues upon the real world in real-time" (p. 3). Similarly, Klopfer and Squire (2008) described AR as dynamically adding contextual virtual information into the physical world and enabling the virtual and the real to share the coherent location in real-time. In short, all these definitions have emphasized the interactive combination of the real and the virtual in a real-world context.

To what extent does AR represent the real world? Milgram et al. (1994) put forward their Reality-Virtuality continuum in which reality stands for the complete real-world and real experience while virtuality is the complete virtual world and virtual experience. Between reality and virtuality, there exists a mixed reality that combines both real and virtual elements, including augmented reality that is close to reality and augmented virtuality that is close to virtuality.

Second, AR has been defined primarily based on the communications technology used. For example, as the computer has developed into a vital tool for communication and collaboration (Billinghurst et al., 2001), many definitions of AR were based on the use of computers. Thus, Zhou et al. (2008) defined AR as a technology that enables physical items to be exactly overlaid by virtual imagery created by computers in real-time. Carmigniani and Furht (2011) also conceptualized AR as a tool that adds computer-generated virtual information to natural environment in real-time. However, they emphasized that AR users not only see the virtual items and clues superimposed on immediate surroundings directly, but also get an indirect view of the physical world, such as a live-video stream. As digital media became an essential technology for communication, the definition of AR evolved to be based on the use of digital media. For example, Ibáñez and Delgado-Kloos (2018) defined AR as "a 3D technology which merges the physical and digital worlds in real-time" (p. 110). Taskiran (2019) further clarified that the digital worlds include images, videos, and audio. Nowadays, as mobile devices have become the primary communication tool; users are able to see superimposed virtual objects displayed on a mobile device instead of a personal computer (Wong, 2013).

Finally, some researchers defined AR based on its function and purpose from the users' perspectives. The early face-to-face computer conferences were in an immersive virtual environment, and the separation of task space and communication space led to a lack of normal communication cues. However, AR enabled computer conference users to see each other's non-verbal cues in the real world. Based on this fact, Billinghurst et al. (2001) defined AR as a technology that provides rich and meaningful multimedia content that is contextually relevant and can be quickly and immediately acted upon. Similarly working from the perspective of learners, Rattanarungrot et al. (2014) defined AR as "a concept for displaying digital contents overlaid on top of real-world scenes that can enhance remarkably a user's learning experiences" (p. 327). Wu et al. (2013) also emphasized the learners' perspective, defining AR in terms of its ability to enable learners to visualize complex spatial relationships by placing virtual objects into the physical environment. It should be noted that the definitions of AR have changed with advances in the affordances of technologies used in AR (Wu et al., 2013). For instance, recent researchers have integrated more current technologies in AR definitions, such as 3D technologies (Ibáñez & Delgado-Kloos, 2018) and digital media (Taskiran, 2019). AR technologies have experienced several distinct developments: from handheld computing to mobile-AR, to the development of AR systems, to location-registered AR, and the development of AR in remote laboratories (Koutromanos et al., 2015; Wu et al., 2013). The usual hardware in AR includes computers, video cameras, storage space, 3D-simulated environment, an interface (e.g., Azuma,1997; Billinghurst et al., 2001; Bower et al., 2014; Zhou et al., 2008) and other technologies such as GPS, image recognition software, speakers and sound systems, internet access and intuitive interfaces (Johnson et al., 2011).

It is clear that none of the three approaches used to define AR can fully capture the essence of AR in education. For example, using certain types of technology to define AR can easily fall short because technologies used in AR are ever-changing. Educators should also keep in mind, as Azuma (1997) cautions, that AR should be considered supplementing rather than as replacing the real world. Finally, the implementation of AR in education should not be considered as an end in itself. Instead, the purpose of AR design and implementation should focus on student learning. Thus, by synthesizing the three aspects of AR that researchers have used in defining AR—the virtual and real interaction, the technologies used, and the purpose of AR in learning—we redefine AR in education as follows:

> AR is a pedagogical tool that blends physical and digital worlds in real-time through different technologies to enable learning of concepts that are hard to understand and to experience phenomena that are otherwise inaccessible or dangerous in real learning contexts.

Application of AR in Education

In K-12 education, AR has been applied to promote student-centered teaching and learning models such as inquiry-based learning (Chiang et al., 2014) and situated learning (Bower et al., 2014). AR has also been studied to increase students' motivation to learn (Chang et al., 2016; Freitas & Campos, 2008), bridge formal and informal education settings (Pérez-Sanagustín et al., & Blat, 2014) and create learning experiences that are not possible in the real world (Wu et al., 2013). Game-based learning has been frequently incorporated into AR's application. For example, Calle-Bustos and colleagues (2017) designed an AR game that placed virtual food on real dishes to create therapeutic education for patients with diabetes during childhood and adolescence in a way that would be user-centric, engaging, and interactive. Their results demonstrated that the children experienced a significant increase in knowledge about a healthy diet after playing the game. Similarly, in order to improve students' interests in learning about plants, Chang et al. (2016) designed an AR game system called *Flora* that included a webcam, a mechanical clock, and a microphone for students to act as gardeners seeding, watering, and caring for virtual plants. The results indicated that students not only acquired more understanding of the processes of plant growth but also were motivated to learn more about plants in the future.

The AR learning system designed by Chiang et al. (2014) for elementary students to learn natural science demonstrated how AR can enhance the learner's active role in the learning process. The system included five stages of activities, encouraging the students to ask, investigate, create, share, and reflect, enabling students to use the GPS to locate authentic learning environment, use iPads to capture images for investigation, search for information about the images in Wikipedia. More importantly, the AR system also facilitated students in sharing what they learned and reflect on their newly acquired knowledge on a deeper level. The whole process was a cycle of inquiry-based learning which allowed students to "develop the confidence to participate in activities, cultivate teamwork abilities, and feel greater responsibilities for controlling their learning process" (p. 353).

In addition to the positive learning outcomes described above, researchers have identified challenges in the process of AR-based learning that originate from three aspects: technological issues, activities and practices designed around the technologies, and student' responses (Radu, 2014; Wu et al., 2013). Technological issues included device failures (Wu et al., 2013) and usability difficulties (Akçayır, & Akçayır, 2017; Radu, 2014). Activities and practices issues ranged from "cumbersome and expensive design" to "inflexibility of the content in AR systems" (Wu et al., 2013, p. 46). Finally, challenges related to students' responses included "difficulties maintaining superimposed information" (Bacca et al., & Graf, 2014) and difficulties in the "interpretation of the clues" (Wu et al., 2013, p. 46), both of which increased students' cognitive load (Radu, 2014). Based on the analysis above, it can be concluded that current studies regarding AR's application in K-12 education have primarily focused on students' learning processes and learning outcomes. More studies of K-12 student experiences, especially regarding why they decide to use AR in their learning, are needed for researchers and teachers to better understand how learners respond to AR-based learning. To bridge this gap, we propose exploring student responses to AR through the lens of the Technology Acceptance Model that interprets users' behavioral intention to use a new technology.

Theoretical Framework

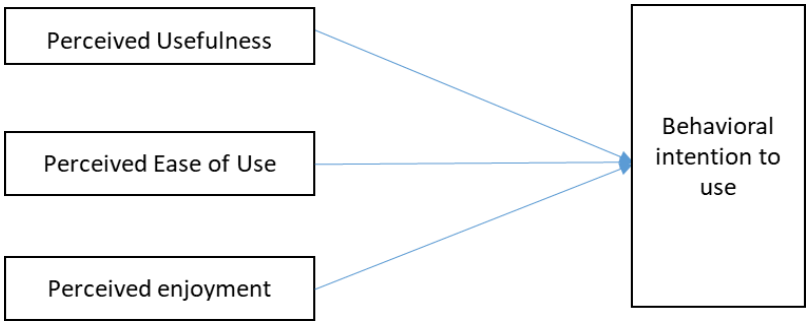
The Technology Acceptance Model (TAM), first proposed by Davis (1989), interprets potential users' behavioral intention to use a new technology (King & He, 2006; ŠUmak et al., 2011). Based on the theory of reasoned action proposed by Fishbein and Ajzen (1975), TAM seeks to explain and predict behaviors of people in a specific situation (Legris et al., 2003), and has been adopted by researchers to examine how and why individuals adopt new information technology. TAM includes two primary factors, the user's perception of usefulness and their perception of ease of use, both influencing the outcome of the user's behavioral intention to use the technology. According to Davis (1989), perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her performance" (p. 320). Perceived ease of use, on the other hand, meant "the degree to which a person believes that using a particular system would be free of effort" (p. 320). Intention of use is the prediction of a user's behaviors to use a technology (Sheppard et al., 1988). In his original model, Davis not only assumed that the two primary predictors—perceived ease of use and perceived usefulness—work together to determine behavioral intention, but also theorized that the perceived ease of use is a predictor of the perceived usefulness.

TAM has become one of the most widely used technology acceptance theories within information systems research (Chuttur, 2009; Holden, & Karsh, 2010; Lai, 2017). Many empirical studies have employed TAM with different technologies in different contexts (e.g., Venkatesh et al., 2003; Liaw et al. 2006), demonstrating that TAM can be a robust model to predict users' behavioral intention in employing a new technology. However, TAM research also generated inconsistent results and different effect sizes in different studies, which may be the result of different types of users, different types of task characteristics, and different types of technologies (Bourgonjon et al., 2010; Legris et al., 2003; ŠUmak et al., 2011; William & Jun, 2006). To address these limitations, many researchers have attempted to extend this model by including factors such as users' prior experience (Jackson et al., 1997; Oh et al., 2003), contextual factors such as cultural contexts (Huang et al., 2003; Straub et al., 1997), and other factors incorporated from other theories such as task requirements from the task-technology fit model (Dishaw, & Strong, 1999; Hardgrave et al., 2003). In addition to users' perceived ease of use and perceived usefulness as extrinsic motivation for them to use a technology, Davis et al. (1992) added perceived enjoyment as an intrinsic element that influences the user's behavioral intention to use the technology. According to the same authors, perceived enjoyment is "the extent to which the activity of using technology is perceived to be enjoyable in its own right, apart from any performance consequences that may be" (p. 1113).

Bearing in mind the strengths and limitations of earlier conceptions of TAM, we adopted the TAM modifications by Davis et al. (1992) for use as a theoretical framework, then conducted a literature analysis of research on AR in order to examine K-12 students' behavioral intention to use AR in learning from the perspectives of students. The TAM framework (see Figure 1) assumes the user's behavioral intention to use a specific technology is influenced by both an intrinsic factor (perceived enjoyment) and extrinsic factors (perceived usefulness and perceived ease of use).

Figure 1

A Framework for Students' Acceptance of AR



Methods

Our literature search included three phases. In the first phase, guided by the research question on students' acceptance of AR in the K-12 contexts, we used keyword searches using terms such as "acceptance," "student acceptance," "augmented reality," "K-12 education," and "technology acceptance model" in leading educational databases (ERIC, Education Full Text, and Education: A Sage Collection) as well as the much broader collections in JSTOR. We found a total of 25 empirical journal articles. In the second phase, we scanned through all the articles to narrow them down by selecting those that used the TAM framework to analyze K-12 students' acceptance of AR and excluded articles that fell into the following criteria:(1) participants are not K-12 students; (2) research did not use TAM as framework to guide their study. Eight empirical articles, six quantitative studies and two qualitative studies, were identified as meeting final inclusion criteria. Of the seven studies, one explored kindergarten children's acceptance of AR, and the other six articles explored students' acceptance of AR in middle and high schools. Table 1 provides an overview of the seven studies, including elements such as participants, sample sizes, activities, technologies used, research methodology, and results. Finally, we conducted a thematic analysis of the seven empirical journal articles (Clarke & Braun, 2013), guided by the framework of the TAM. We gave specific attention to the impact of the three elements from our theoretical framework, perceived usefulness, the perceived ease of use, and the perceived enjoyment on K-12 students' intention of using AR in their learning.

Table 1

Basic Information of the Analyzed Studies

Author/Year	Participants	Sample Size	Activity	Technology	Methodology	Results
Balog & Pribeanu (2010)	8th graders	139	AR-based learning scenarios	ICI's platform	Started with an exploratory study to develop the instrument followed by a confirmatory factor analysis to test the validity and reliability of the instrument. The established instrument was used to test the hypotheses.	➢ PE on BI (β=0.26, t =2.50, p<.05) ➢ PEOU on BI (t =0.42, p >.05) ➢ PE and PU (β=0.43, t =4.99, p<.05)

Author/Year	Participants	Sample Size	Activity	Technology	Methodology	Results
Gopalan, et al. (2016)	Secondary school students	70	Science learning	Enhanced science textbook using AR	Adopted previously validated instruments and the questionnaire was adapted mainly from the Instructional Material Motivational Questionnaire II(SMQII). Data were analyzed through Pearson Correlation and Regression Analysis.	➢ PEOU on BI (t =1.06, p >.05) ➢ PE on BI (β = 0.22, t = 2.05, p <0.04)
Arvanitis et al. (2011)	12-17 years old	170	Visiting museums	Head-Mounted Display	The constructs of the model as well as the hypotheses were tested by Common Factor Analysis, Structural Equation Modelling, and Harman Single Factor Test. Latent Mean Analysis was used to test the moderating factors	➢ PEOU and PU (R^2=0.546, p<.05) ➢ PEOU and BI (R^2=0.4., p<.05) ➢ PU and BI (R^2=0.743, p<.05)
Huang, et al. (2016)	A senior-level high school	30	Early art education	A mobile AR application	Qualitative data was analyzed by content analysis (QCA)..	90.9% of them wanted to use AR for class activities again.
Di Serio, et al. (2013)	13-16 years old	55	A visual art compulsory course	A markerless tool	Qualitative data was collected by observation of students interacting with the AR learning environment, and post-experience interviews.	Students have high behavior intention to study in AR-based environment.
Wojciechowski & Cellary (2013)	14-16 years old	42	Chemistry curriculum	AR environment	Eleven hypotheses were formulated based on literature review. Step Wise Multiple Regression Analysis was conducted to test all the hypotheses.	➢ PE on BI (R^2=0.737, p<.05) ➢ PU and PEOU (R^2 =0.346, p<0.05) ➢ interface style and PEU (R^2 =0.346, p<.05) ➢ interface style and PU (R^2 =0.478, p<.05) ➢ interface style and PE (R^2 =0.368, p<0.05).
Yuniarto et al. (2018)	Secondary	140	Game	AR-based card game	Discriminant Validity, and Path Coefficients PLS Algorithms Analysis were used to test the model from literature review. Hypotheses were tested by Path Coefficients from Bootstrapping Analysis.	➢ PEOU on BI (t=4.02, p<.05) ➢ PU on BI (t=3.88, p<.05) ➢ PEOU and PU (t=7.99, p<.05)

Author/Year	Participants	Sample Size	Activity	Technology	Methodology	Results
Juniawan et al. (2020)	7-9 years old	19	AR applications/systems	Introduction of traditional music instruments	Pearson Correlation Coefficient Analysis and Regression Analysis	➢ PEOU and PU (R=0.117, p<.05) ➢ PE and PU (R=0.206, p<.05) ➢ PEOU and PE (R=0.254, p<.05)

Findings

Three primary findings emerged from the analysis. First, K-12 students' behavioral intention to use (BI) AR was positively influenced by their perceived usefulness (PU), perceived ease of use (PEOU) and perceived enjoyment (PE), though PEOU was not a stable factor to influence BI. Second, researchers demonstrated the relationships among perceived enjoyment (PE), perceived usefulness (PU), and perceived ease of use (PEOU). Third, a secondary finding merited attention: AR interface design did not significantly influence learners' behavioral intention to use AR in their learning.

PU, PEOU, and PE Influence on BI

Theoretically, the modified TAM model (Davis et al., 1992) assumes that a user's perceived ease of use, perceived usefulness, and perceived enjoyment work together to influence the user's behavioral intention to use a technology. Our analysis found evidence to support this assertion in K-12 students' acceptance of AR. For example, Yuniarto et al. (2018) designed a card game based on AR technology to evaluate the extent of secondary students' acceptance of AR technology. The results demonstrated that PEOU exerted a significant effect on their BI (t=4.02, p<.05). It also indicated that PU exerted a significant influence on BI as well (t=3.88, p<.05). In order to explore the relationships among the factors of TAM, Balog and Pribeanu (2010) performed an experiment in which 139 eighth grade students participated in two AR-based learning scenarios (a biology scenario and a chemistry scenario). The results indicated that PE exerts positive effects on BI (β=0.26, t =2.50, p<.05). In line with Balog and Pribeanu (2010), Wojciechowski and Cellary (2013) also proved that PE was a significant predictor for BI (R^2=0.737, p<.05) after evaluating 42 secondary students' attitudes towards AR-based classes.

However, some researchers also found that PEOU was not a stable predictor for BI. For example, Balog and Pribeanu's (2010) study demonstrated that there was no significant relationship between PEOU and BI (t =0.42, p >.05). Similarly, Gopalan et al. (2016) used an AR-based science textbook to examine whether AR was useful to promote secondary students' interests in learning science. Their results suggested that PEOU exerted an insignificant influence on BI (t =1.06, p >.05). Arvanitis et al., (2011) argue that PEOU was not a stable factor for measuring users' acceptance due to "different technologies, applications and level of experience" (p. 6), and they further suggested that PEOU did not matter for students' acceptance of AR unless they perceive AR's usefulness in their learning.

Relationships between PEOU, PU, and PE

In addition to the influences of PEOU, PU, and PE on BI, researchers also validated the relationships between PEOU, PU, and PE. First, research demonstrated that PEOU shaped PU significantly. In the study of Yuniarto et al. (2018), 140 secondary students' data were used for an independent sample *t*-test to ascertain the extent to which students accept AR technology. The results of the analysis indicated statistically significant differences between the PEOU and PU (t=7.99, p<.05), suggesting that PEOU exerted a significant effect on PU. Juniawan et al. (2020) conducted a study on nineteen students aging from seven to nine years old to learn traditional music instruments in an AR-based system built on Android. The result also validated that PEOU and PU were positively correlated (R=0.117, p<.05).

In addition, students' perceived enjoyment (PE) was strongly correlated to their perceived ease of use and perceived usefulness. According to Balog and Pribeanu (2010), students' perceived enjoyment (PE) for the AR-based learning scenarios had a positive relationship with their perceived usefulness (PU) of such learning (β=0.43, t =4.99, p<.05). Wojciechowski and Cellary (2013) found that students' perceived enjoyment (PE) was significantly correlated with their perceived ease of use (PEOU) of the AR-based class (R^2 =0.346, p<0.05). Juniawan et al. (2020) also found that elementary students' PE was positively related to PEOU (R=0.254, p<.05), with PU (R=0.206, p<.05) after they engaged with the AR-based traditional music instruments. In the case study of Huang, et al. (2016), a series of AR-based art education activities were carried out for 30 kindergarten students. The results indicated that all the participants felt it was enjoyable to play with AR, and 90.9% of them wanted to play AR activities again. The researchers discovered that "[the students'] reactions to the AR-based animation was very different from those to seeing a plane printed on a piece of paper" (p. 891).

Secondary Findings: AR Interface Design and Students' Acceptance of AR

Multiple studies demonstrated that the AR interface design had no significant influence on students' acceptance of AR. According to Wojciechowski and Cellary (2013), the correlation between interface style and students' acceptance of AR was small, with interface style and PEU (R^2 =0.346, p<.05), interface style and PU (R^2 =0.478, p<.05), interface style and PE (R^2 =0.368, p<0.05). Di Serio et al. (2013) established AR-based art classes for secondary students, finding that the technical problems related to the images used in their AR did not influence students' use of AR. For example, a student commented that "the image is shaking, this is a little bit annoying but…I can continue" (p. 7). Similar comments from students included, "I notice that I have to maintain the picture centered but…it is fine" (p. 7), and "sometimes I lose the image. Nevertheless, it is easy to recover it" (p. 7).

Discussion and Conclusion

Based on the findings above, it appears that, overall, K-12 students have high behavioral intention to use AR in learning. They tend to have high perceived usefulness, high perceived ease of use, and high perceived enjoyment in AR-based learning, thus demonstrating a relatively high behavioral intention to use AR. However, it is crucial to realize that although some research indicates PEOU's positive influence on BI, other research also suggests that students' PEOU is not a stable predictor of their BI because of different technologies and different purposes during AR implementation.

Regarding the interrelations among the PU, PEOU, and PE, research indicates that students' PEOU has a significant impact on their PU. In addition, students' PE has a strong correlation with PEOU and PU. Perceived enjoyment is a pleasant emotional state which is positively related to "learning-related motivation, regulatory efforts, activation of cognitive resources and performance" (Frenzel et al., 2009, p. 705) and arouses the learners' interest to reengage the learning activities over time (Hidi, & Renninger, 2006).

Research suggests that AR-based learning, as a new pedagogical tool applied in K-12 education, has a demonstrated effectiveness in enhancing student learning. For example, AR-based learning can enhance cognitive processes and thinking skills of K-12 students (Jee et al., 2014). Students' social processes of collective knowledge construction are also enhanced during AR-based learning (Kose et al., 2013). From the perspectives of schools, AR-based learning has the potential to improve effectiveness because new forms of digital technologies can be helpful to improve outcomes of schools such as increasing students' examination results and retention rates (Darling-Hamond, et al., 2014; Ilomäki & Lakkala, 2018; Selwyn, 2016; Wong & Li, 2011).

Though the educational benefits brought by AR-based learning are promising and this study has demonstrated that K-12 students have high acceptance of AR-based learning, K-12 educators and administrators have to bear in mind digital equity and recognize the potential pitfalls of AR becoming an institutional tool to exacerbate prevailing inequities in K-12 schools (Reich, 2019). Digital inequity can manifest as inequitable access to technological infrastructures and devices, uneven activities and practices designed around technology, and overall inequitable issues in the social context of K-12 schools (Liu et al., 2018; Liu & Ball, 2019; Selwyn, 2016). As with any technological innovation, AR must inevitably confront issues of digital inequity. For example, Rideout and Katz (2016) conducted a nationally representative telephone survey of 1191 lower-income parents with children from 6 to 13 years old to find out how school-aged children in disadvantaged families use technology at home. It showed that though 94% of the surveyed families had access to the Internet, the quality of their online experience was not satisfying. The lower income families were more likely to have "service cutoff, slow service, older technology or difficulty using equipment because too many people sharing devices" (p.10). Though schools have made improvements in providing all students equal access to technology at home, access to technology alone does not shrink opportunity gaps (Howard et al., 2018). Students from families with lower income tend to live in communities where schools have more challenges in hiring and retaining teachers who are able to design high-quality instructional practices using technology (Alliance for Excellence in Education, 2016). As such, school and district administrators need not only to provide equitable distribution of AR equipment and software among schools, and but also professional development opportunities for their teachers to learn how to design and implement AR-based learning in their classrooms.

The National Center for Education Statistics conducted a survey (U.S. Department of Education, 2016) about the percentage of K-12 children in households with a computer. When examined in terms of the participants' race, ethnicity, and linguistic diversity, the data indicated inequities in access to technological devices such as desktop, laptop, netbook, or notebook computer, handheld computer or smart mobile phone. As Howard et al (2018) observed, "access to computers in public schools over the years has mirrored the disparities [by race/ethnicity]" (p. 20). As a result, schools that have high percentage of students coming from racially, ethnically, and linguistically diverse communities need more infrastructure support to implement AR. Classroom teachers play an important role in addressing digital equity while implementing AR-based learning. On the one hand, they need to have high expectations of their students and design intellectually challenging activities based on

AR for students regardless of their racial, ethnic, or linguistic backgrounds, avoiding inequitable practices toward diverse students such as the technical drilling, disciplinary scare tactics and social isolation identified by Monahan (2004). On the other hand, when teachers design AR-based learning that requires home support and parent involvement, they need to have alternative projects for students who might not have access to the technology or adult supervision needed to complete the assignments. As discussed earlier, AR implementation in K-12 classrooms should not be considered as the end goal. The ultimate goal should be fostering learning for all students.

Limitations

There are a variety of limitations to this study, the most significant of which is the lack of information in the reviewed studies placing the sampled students in a fuller social-political context. As Selwyn (2016) observes, "Education change is not a straightforward process. Not everyone benefits from an educational innovation in the same way, and from a more practical perspective, the consequences of educational change are often difficult to assess" (p. 35). Yet without knowledge of the students' racial, class, and gender positionality it is a challenge to explain the high acceptance of AR-based learning. For example, the acceptance levels could be due to the school serving a relatively wealthy student population with high accessibility to educational technology in general as well as highly trained and well-prepared teachers; students in less well-funded schools might not have similar access to technology and teacher expertise, feel less comfort with the basic elements of educational technology, and thus accept AR-based learning at lower levels. Moreover, this limitation is generalizable to the TAM model adopted in this study, which does not take into consideration important contextual factors such as school culture and the socio-economic status of students.

Second, there is a relatively small number of empirical studies on K-12 students' acceptance of AR, and the available research primarily focuses on secondary school students. More studies on K-12 students, especially elementary students, would broaden the current understanding of students' acceptance of AR in their learning. Third, most studies analyzed in this paper are quantitative, demonstrating a lack of qualitative perspectives that explore students contextualized, real-life experiences in using AR. Finally, the activities and practices in AR applications studied in this paper are primarily designed for science, art, and chemistry learning, revealing little about students' acceptance of AR in other subject areas such as literacy and social studies. These limitations, however, provide opportunities for researchers to further study K-12 students' acceptance of AR in order to bridge these gaps.

Nevertheless, this study has both theoretical and practical implications. Theoretically, this study further supports that K-12 students' behavioral intentions to use AR is influenced by their perceived usefulness, perceived ease of use, and perceived enjoyment. From the practical point of view, understanding K-12 students' AR acceptance will inform the AR-based learning design and implementation with specific attention to the three aspects: making the AR-based learning useful for the students' real-life learning, designing AR-based activities that are easy for the students to navigate, and making the learning process fun and enjoyable. By doing this, teachers are more likely to improve the successful implementation of AR and avoid resistance from the students in the K-12 contexts.

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

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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

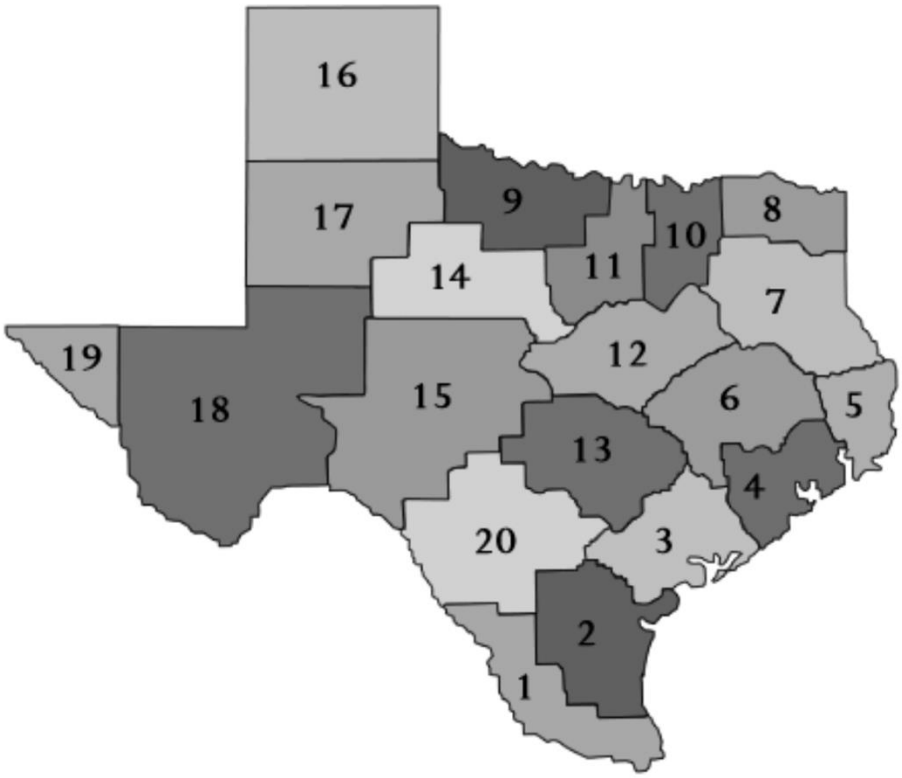
Description of Texas K-12 school districts in the sample (n=764)

District Type	n
Charter School	123
Rural	210
Independent Town	58
Other Central City	35
Other Central City Suburban	115
Non-Metropolitan, Fast Growing	26
Non-Metropolitan, Stable	120
Major Suburban	66
Major Urban	11
Total	764

TEA Region	n
Region 1 – Edinburg	22
Region 2 – Corpus Christi	28
Region 3 – Victoria	22
Region 4 – Houston	75
Region 5 – Beaumont	24
Region 6 – Huntsville	33
Region 7 – Kilgore	56
Region 8 – Mount Pleasant	30
Region 9 – Wichita Falls	23
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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Disrupting White Teacher Education & Scholarship

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Disrupting White Teacher Education & Scholarship

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Dear White[1] colleagues:

What lies beyond this sentence might challenge you, and we encourage you to let it. What you've stumbled into—and agreed to by accepting to continue reading—is an examination of the role of Whiteness in the College of Education at the University of Texas at Austin (and, by extension, the University at large, the City of Austin, the State of Texas, and the United States). Most importantly, we are reminding ourselves as White scholars and teacher educators, collectively, of an uncomfortable truth: we are implicated in the dominance of Whiteness. We write this editorial at a time when the threadbare fabric of institutional Whiteness is tearing with increasing force. The recent murders of George Floyd and Breonna Taylor at the hands of police, fresh in our minds and hearts, are a searing indication of our nation's struggle with institutional racism, and academia must pay heed. Just as policy adjustment and reform are inadequate for changes to public safety, so too must we interrogate White-normed education research and teacher education as we dream of a more just foundation for future teachers. In this letter, we invite you to join us in regularly noticing White privilege and engaging in concerted divestment; analyzing the racialization of policies, systems, and social patterns in which we participate; holding one another accountable for racially just action and repair; and advocating for sweeping changes to education systems and institutions.

In our context, teacher education occurs within an institution whose economic, social, and cultural foundation is White settler colonialism. Additionally, epistemological lineages and traditions of higher education are steeped in White discourse patterns that maintain a stronghold on how knowledge is presented in courses—from appropriateness in participation to what voices are prominent on syllabi. Reading the stories of Black scholars across the country found using the hashtag #BlackintheIvory presents a harsh reality: the academy is a toxic and racist space for scholars of color. For far too long in teacher education specifically, our colleagues of color have borne the weight of silence, dismissal, invalidation, and cultural violence in order to participate (Delgado-Bernal, 2001; Moglen, Christian, & Abel, 1997; Picower & Kohli, 2017; Saavedra & Salazar Pérez, 2012), and as friends and allies, we are asserting a proverbial line in the sand.

Research illustrates patterns of racial invalidation, such as underrepresentation and lack of support, that people of color experience as they become teachers (Brown, 2014; Carter Andrews, Castro, Cho, Petchauer, Richmond, & Floden, 2019; Delgado-Bernal, 2001; King, 1991; Picower & Kohli, 2017). In part, these experiences are due to our nation's history of racism in K-12 schooling, a history evident in the elimination of Black teaching jobs (and thriving Black schooling communities) during desegregation, for example (Siddle Walker, 2001). Such inequitable racial distribution of

[1] The choice to use the uppercase "W" in the word "White" when used to refer to a group of people is strictly in adherence to APA guidelines.

educators in K-12 and higher education spaces remains today. According to the U.S. Department of Education's National Center for Education Statistics (2018; 2019), 80% of US public school teachers are White, whereas children of color make up 51% of the student population. Additionally, despite higher education admitting more students of color, the professoriate still remains primarily White. Nearly 72% of faculty at The University of Texas at Austin are White (University of Texas at Austin, 2019).

We ask you to see clearly with us another vestige of the racist history of academia and teacher education: that a Eurocentric ideology pervades the curriculum of teacher education programs. Pre-service teachers are asked to "model standard English when speaking to students"[2] exposing a raciolinguistic listening bias toward Whiteness (Flores & Rosa, 2015). We ask student teachers to focus on "classroom management" over relational pedagogy, emphasizing an expectation of teachers to monitor and manipulate young children's bodies into compliance. When we participate in these ways of thinking and teaching, we uphold racist, dehumanizing ideologies. Prescriptive righteousness in all forms—linguistic, behavioral, social, for example—stems from the academy itself and quite truly counters the struggle to embrace anti-racist practices. But we believe it is the academy, too, that can pull the thorn from her own foot. We invite you to challenge dominant thinking about teacher education and to advance entirely new ways of preparing teachers. How righteous that would be.

As colleagues and friends who value the lives, the contributions, the full lived experiences and histories, and the wellness of scholars of color, we must collectively take up the work of striving to be actively anti-racist (Kendi, 2019). It is not enough to read and learn and think about anti-racism: we White scholars have to do the work. While advocating for structural change in K-12 education and the academy, we must also regularly reexamine our scholarly participation. We ask you to think with us as we consider normative, institutionalized White discourse patterns (Jones & Okun, 2001), and we invite feedback and brave conversations as we build our alliances. Indeed, academia reifies notions of power by protecting White feelings and comfort over justice (DiAngelo, 2018; Matias, 2016). Likewise, when White fear of conflict emphasizes being polite, we risk simplifying or glossing over the complexity of systemic inequity, putting individuals over resolution and progress (Haviland, 2008); participation without a critical lens is indeed a form of White privilege (Lipsitz, 2006).

Championed by the work of The Southern Poverty Law Center (SPLC), Teaching Tolerance, and Dismantling Racism, it is crucially important that we "speak up" and hold one another accountable (Jones & Okun, 2001; Willoughby, 2018). We must look past diversity initiatives and calls for inclusive representation into what it actually looks like and sounds like to be inclusive, in service *to* and in recognition *of* authentic belonging (Cobb & Krownapple, 2019). Below, we provide examples of behaviors and language for you to adopt in practice. We want to make clear that these suggestions do not directly, radically transform oppressive systems, but they do give us tools to chip away at our own complicity within a racist system. These seemingly small changes and actions are needed flotation devices while we simultaneously drain the ocean of Whiteness.

An Incomplete List of Strategies and Actions to Dismantle Whiteness

- **Accept the mantle of learning without requiring people of color to provide clarification or feedback on racial matters**. As learners, we have a variety of resources at our

[2] Words of a White University of Texas College of Education faculty member instructing pre-service teachers.

disposal. As humans, we also know that we can learn a lot from the experiences and stories of others. That being said, it is unnecessary and often oppressive to ask people of color to weigh whether a situation was racially charged or whether a joke we heard is appropriate. Instead, seek out White peers to process racialized experiences.

- **Consider participation patterns and styles.** Academia is a space with its own discourses of achievement, urgency, and appreciation (Jones & Okun, 2001). The hierarchical power structures, rules and regulations, and presentation styles all embody certain ways of maintaining Whiteness (among other hegemonic identities), evident in the "toothless" way many Universities have responded to the murder of George Floyd (England & Purcell, 2020). White academics must consciously reroute discursively fossilized, passive rhetoric into action, editing documents to leave vague missives and clichés on the cutting room floor. For instance, simply revising course content to incorporate contributions from scholars who are Black, Indigenous, and people of color (BIPOC) is not enough. Decentering quintessential "classics" or "seminal" works by White scholars is important, but doing so also demands critical analyses and interrogation. Twitter, for example, is brimming with critical, educational discourse eager for our following and consideration. Check out #CiteBlackWomen, #EduColor, and #ClearTheAirEdu to begin. Call out and refuse to join all-White panels of scholars. When presenting or sharing in class, be metacognitive—notice who is speaking the most, whose thoughts are being validated, and how these ideas are taken up in conversation. This is not altruism, it is racial justice.

- **Heed the responsibility of anti-racist research practices.** We don't have to take up race-centered projects to do anti-racist research. However, we must recognize ways in which our work is inherently racialized. Race is inextricably bound to study design, participant interactions, data collection, interpretation and analysis, and reporting of findings. Look no further than the development of standardized intelligence assessments that claimed to provide scientific evidence of a racial hierarchy, racist assessments that have been "improved" upon and are still readily used today in schools (Gonzalez, 1999; Kendi, 2019; Oakes, Lipton, Anderson, & Stillman, 2013; Selden, 2000). Humans are racialized beings who filter our experiences—even our inquiry—through our racialized brains. How can we interrogate academic appropriateness (Flores & Rosa, 2015), and not assume, as Jacques Derrida once noted in an interview, "that what has been conditioned by history, institutions, or society is natural" (Derrida, posted YouTube interview, July 7, 2008)?

- **Recognize the impact of White voices, presence, and projects, regardless of intention**. The ultimate measure of our actions and words is how they render others, whether by limiting, constraining, uplifting, or amplifying. A well-intentioned question or comment can be just as racist as an ill-intentioned one. If we are unsure or feeling uncomfortable, we should embrace humility as a foothold to growth. In fact, as researchers, we may need to reconsider the very measure of validity, welcoming emotion as a signpost for our own learning. I (Kerry) have often struggled to feel "ready enough" to participate in racial discourse. One afternoon, in racially mixed company at a lunch meeting, I shared this fear of not having the right words to articulate racialized ideas and experiences, and a Black acquaintance turned to me with an incredulous look: "Wait, so you're more worried about looking stupid than protecting my humanity?" I have never been the same since. Today, offering imperfect responses, writing imperfect emails, and stumbling through apologies and revisions, I

galumph forward. To decenter Whiteness, I learned, means to recognize and eliminate White ego in all its modes and manifestations. Nothing is exempt and our work is never finished.

- **Hold one another accountable**. Develop trust and understanding within groups of other White folks in ways that make speaking up commonplace and expected. Become familiar with the speak-up strategies from Teaching Tolerance: interrupt, question, educate, echo (Willoughby, 2018) and build a critical race vocabulary (Matias & Liou, 2015) in order to build confidence and dexterity with racialized and biased confrontation. Only in conversation and community can we move from seeking comfort and safety into building language and tools for active anti-racism. Please, do us a favor: interrupt us when we cause harm, call us in to what we cannot yet understand. We'll do the same for you.

- **Recognize that mistakes are inevitable.** We are learners familiar with storybook narratives about learning as a journey and using learning as a justification for mistakes. However, responding to allegations of racial injustice with a version of this truism ("we're all learning") is dismissive and not helpful. Yes, it is important for us to learn from our missteps in language and behavior, but it is also important to act to redress injustices. If someone holds us accountable because we have done or said something racist, we must believe them, apologize, learn from it, and do something anti-racist in response.

- **Be reparative and reconstructive in response to mistakes.** As we get it wrong—because we will—it is incumbent upon us to redress the racial harm we cause. The "forgive and forget" model won't work, nor will simply chalking it up to learning or growing. Instead, our mistakes must trigger in us a response that moves far beyond reconciliation. It should bring us back to this list, a commitment to (re)learning our responsibilities and a reorientation toward anti-racism.

- **Advocate for sweeping changes to K-12 and teacher education.** Brilliant voices of leaders in our field like Bettina Love call for nothing short of abolition (Love, 2019). Abolitionist teaching requires a total replacement of the existing system. As Love writes, "Being an abolitionist means you are ready to lose something, you are ready to let go of your privilege…" (p. 159). Consequently, and concurrently with calls for abolition, it is on us to abandon methods and practices that do not center families, communities, their histories, and their dreams. Notice when you find yourself defending particular teaching practices or methods. We cannot insist on versions of social-emotional learning (SEL), for example, that emphasize kindness and respect over justice and equity. If compliance is the goal, we must interrogate the path.

Conclusion

So, what does this mean for us as we work to shift consciousness and decenter Whiteness? How do we enact anti-racist research practices, and how do we envision critical mentorship and coaching of preservice teachers? How do we manage individual scholarship with the actions we take as researchers-in-community, with each other, and within the communities in which we collect our data? How can we promote abolitionist teaching given that our program, too, is woven into other racialized systems like local school districts, the state education agency, state law that governs official curricula, and University policies regarding course and program changes? Though we have much to learn (and

unlearn), we are committed to reflect along the way, in-community, with each of you. As scholars, we hold considerable privilege in having time to think about this work. As *White* scholars we have an additional responsibility to proceed with an anti-racist lens, because we are, quite truly, taking up the master's tools in doing this work (Lorde, 1984). While we work to abolish and dream education anew, we need principally to make sure that we decenter ourselves to showcase the mindful anti-racist work already happening.

In that spirit, we have one final suggestion that can't possibly be placed alongside the others, for both its simplicity and power make it distinctive: ***Listen***. Take on a listening stance with research participants, colleagues, students, and friends of color. Validate lived experiences with acknowledgement; continuously reflect on biases, and let people leave us changed for the better. We must listen with our ears and with our position as a reader and critical consumer of texts. Seek out critical race media, and trust and believe the stories that people of color entrust to our open hearts.

Begin now by learning from scholars doing this work in our local context. In Austin, consider following the work of UT alumni Dr. Angela Ward (http://2wardequity.com/blog/) and Bavu Blakes (https://scholaremcee.com), and sign up to receive the Austin Independent School District's Culturally Proficiency and Inclusiveness newsletter (https://www.smore.com/vspce-cp-i-newsletter-aisdequity). As mentioned above, Bettina Love's (2019) recent book *We Want to do More than Survive* beautifully links contemporary racial injustice in schools to anti-racist actions teachers and teacher educators can take. To better understand the history of structural racism in the United States, we recommend Michelle Alexander's *The New Jim Crow* and the Netflix documentary *Thirteenth*. Finally, as most of the teaching force is White women, readers might consider picking up *Hood Feminism* by Mikki Kendall, which reminds us that equitable education is indeed a feminist issue. We welcome your recommendations, too.

Do not be fooled—we (the authors) are not providing a list that reflects our choices and behaviors. If we were subjected to an anti-racist purity test, we would surely fall short. The list we have compiled does however reflect our values and the values of the College of Education (See UT's Teacher Education Cross-Cutting Themes and Creed). It represents the standard against which we want our teaching, research, and service to be evaluated. Change is overdue. Our collective, historic complicity with the academy's racist, hegemonic system can no longer bear the mark of individual ignorance or apathy. Kendi (2019) reminds us that "Denial is the heartbeat of racism, beating across ideologies, races, and nations" (p. 9). Choosing to remain silent, to not put race upon every table, is careless, partial, and unacceptable. Divestment of White privilege is not entirely possible only by individual acts, and our actions will not release us from the benefits we continue to reap from it. If we are to confront racism in the academy, we must embrace our debts, accept our partiality, and trade our chorus of voices for listening ears. Join us.

With hope and invitation,
Jimmy McLean and Kerry Alexander

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The Expansion of Exemption: Texas' Districts of Innovation

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The Expansion of Exemption: Texas' Districts of Innovation

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Recent shifts in the U.S. public educational system have continued to push it towards deregulated, market-based educational models (Baltodano, 2012; Berliner & Biddle, 1995; Hursh, 2005; Ladd, 2002). In Texas, this movement towards deregulation has culminated in public school districts assuming unprecedented levels of local control. Beginning in 2015, a change to Texas law provided school districts with the opportunity to convert to so-called "Districts of Innovation" (DOI). Echoing the logics of charter schools, these DOIs grant broad autonomies to traditional public school districts, arguing that allowing schools to circumvent burdensome or counterproductive aspects of state law will result in more efficient and effective schooling (TASB[a], n.d.; Texas Public Policy Foundation, 2012; Raise Your Hand Texas, n.d.).

Texas' DOI policy has imbued traditional public school districts with considerable powers to exempt themselves from state regulations that govern nearly all aspects of education. Proponents argue that exempting school districts from onerous bureaucratic requirements will allow local authorities to provide education more efficiently. For example, districts may exempt themselves from caps to class sizes (currently set at 22:1 for elementary schools), a move that some have argued will allow districts to realize cost savings without compromising student outcomes (e.g., Hanushek, 1999; TPPF, 2012). In addition, proponents suggest that granting districts the flexibility to set their own school calendars may increase their options for offering professional development opportunities and allow alignment of instruction with state accountability testing and other milestones (TASB[b], n.d.). Moreover, advocates contend that exempting districts from teacher certification and contract requirements will enhance districts' abilities to recruit and retain effective teachers (e.g., Goldhaber & Brewer, 2000; TPPF, 2012).

In just a few years since the enaction of Texas' DOI policy, the majority of districts have elected to become DOIs. While Texas' sweeping DOI reform has been covered by the popular media (e.g., Webb, 2016; Association of Texas Professional Educators, n.d.), it has received scant scholarly attention despite the widespread impact of this policy on nearly all aspects of schooling. In this article, we review Texas' DOI policy, outlining the scope of exemptions under the policy and exploring the implications of widespread district exemptions from state policies originally established for the protection of teachers and students.

DOI Policy Adoption Procedure

In 2015, Texas precipitated a quiet but dramatic shift in public education by amending its education code to include Chapter 12A, allowing school districts to convert to "Districts of Innovation" (Texas H.B. 1842). Under the new rules, by self-designating as a DOI, traditional public school districts may exempt themselves from state laws governing nearly all aspects of education, including teacher certification and contracts, parental notification of exceptions to state rules, class size, state disciplinary policies, length of school day, and school start/end date. Each DOI plan is developed

by the district and based on its unique needs, and each district can set their own varying levels of exemption.

The rapid expansion of DOIs has been facilitated by the minimal eligibility requirements. According to the Texas Education Code, to be eligible for conversion to a DOI, a district must be rated as "academically acceptable" or better (TEC §12A.001B). To qualify for this designation, a district must meet or exceed the state minimum test score metrics, which under the current system is equivalent to a district rating of 'C' or better on the state's A-F accountability system (TEC §39.054). In practice, this means that the vast majority of public school districts are eligible to become a DOI; In 2019, over 95% of all traditional public school districts earned this designation and met minimal DOI eligibility requirements (TEA, 2020).

The process by which districts may convert to a DOI also presents relatively few obstacles to districts in practice. The DOI conversion process can be initiated by either the school board or a district-level committee (TEC §12A.001C). The district must then notify the public of its intent to draft a plan and identify what exemptions they plan to take, noting which areas of the education code inhibit innovation and providing a rationale for exemption (TEC §12A.002B). The applying district must post the plan for 30 days, notify the public and hold an open meeting, notify the commissioner of its intent, and receive approval from the majority of the DOI committee (TEC §12A.005B). Finally, the motion to convert the district to a DOI must secure a majority two-thirds vote from the school board of trustees to be formally adopted (TEC §12A.005B). Notably, the first public hearing of the plan and the final vote can take place at the same meeting (TEC §12A.005.A3). The plan must have a sunset clause of no longer than five years (TEC §12A.006). Other than these minimal requirements, TEA does not provide any oversight over the process of converting to a DOI (i.e., TEA does not need to formally approve district plans).

To aid districts interested in conversion, the Texas Education Agency has prepared a PowerPoint of DOI examples, which features two district timelines as exemplars of conversion (TEA[a], nd). The figure below illustrates the conversion timelines for the two exemplar districts, Spring Branch ISD and El Paso ISD, including the public's opportunities for formal comment on the process and plan.

Figure 1

TEA Innovation Overview Exemplars

Spring Branch ISD	**El Paso ISD**
• September 28, 2015 – process initiated • November 4-December 1, 2015 – 4 community meetings held • March 24, 2016 – Plan posted on website • March 29-April 14, 2016 – 4 community meetings held • April 25, 2016 – DOI adopted Total time: ~7 months	• December 15, 2015 – process initiated • April 15, 2016 – plan posted on website • May 5, 2016 – public meeting and final plan adopted • May 17, 2016 – DOI adopted Total time: ~ 5 months

Note: Adapted from Spring Branch ISD Plan of Innovation (n.d.). and El Paso ISD Plan of Innovation (n.d.).

A number of districts have followed an even more accelerated timeline than El Paso's rapid conversion. For example, Grandview ISD converted to a DOI in just 91 days, two months after the first public notice of intent. Moreover, Figure 2 shows that the first public meeting and the final vote of approval occurred on the same day.

Figure 2

Grandview ISD's DOI Conversion Timeline

Grandview ISD
• January 9, 2017 – process initiated • February 20, 2017 – public hearing and board approved committee • March 3, 2017 - DOI committee meeting to develop plan • March 6-April 7, 2017 – 30 days public posting of finalized plan • April 10, 2017- Public hearing to discuss DOI Plan, presentation to Board of Trustees, and Board-approved plan submitted to Commissioner
Total time: ~3 months

Note: Adapted from the Grandview ISD Plan of Innovation (n.d.).

Importantly, while Texas law requires districts to provide an opportunity for community input, the extent to which this meaningfully occurs is unclear. While Spring Branch ISD took public comments prior to finalizing its plan, not all districts have done so. Furthermore, although the final DOI plan must be posted for 30 days prior to the vote, public meetings and comments that take place between the final posting and school board vote may have limited influence. For example, El Paso ISD and Grandview ISD's public input during these 30 days did not result in any changes to their final plans. While this may indicate unanimity of agreement with the plan, it may also suggest that the public input was disregarded in a process that is largely pro forma. As such, the DOI conversion process at the district level is governed by a small, select group serving on school board appointed committees who secured exemptions to state mandates that were previously ubiquitous in Texas schools.

Scope of DOI Adoption

Facilitated by this streamlined process, the proliferation of DOIs has been staggering: In the first three years of the policy change, more than 740 of Texas' 1,025 traditional public districts became DOIs (Author Calculations, data from TEA[b]). As a result, more than three-quarters of all public school students in Texas are now enrolled in a traditional or charter district that provides exemptions from one of more of the state's education policies (Author Calculations, TEA data). While charters are subject to extensive public and scholarly debate in Texas as nationally, they enroll less than a tenth as many students as DOI districts (TEA[b]). As the popularity of DOI conversion continues throughout Texas, there are now large number of Texas students enrolled in a DOI, which have had far less scrutiny than charter schools, which enroll far fewer students.

Unlike many other reform movements in Texas, DOIs are concentrated in a whiter and more affluent segment of traditional public schools. Whereas charter schools in Texas have generally taken hold in lower-income districts with high minority enrollment, DOIs tend to be wealthier and enroll fewer students of color than non-DOI districts. On average, DOIs enroll 11 percentage points

fewer economically disadvantaged students than non-DOIs (55% vs. 66%), and half the share of black students (7% vs. 14%). While charters tend to be concentrated in urban areas, DOIs tend to be clustered in towns and rural areas. This uneven policy adoption of DOI is perhaps not surprising given that districts must be rated academically acceptable to qualify for DOI status, and districts with concentrated poverty and disadvantaged populations are more likely to be precluded from the process.

Our research in this vein suggests that DOIs have adopted a wide range of exemptions (Texas Education Agency[b], n.d.). In total, DOIs have claimed 40 different exemptions across 8 chapters of the Texas Education Code. One district—Pearland ISD—took 21 separate exemptions. While some of these exemptions are procedural, others present significant substantive changes to district policy. Nearly all DOIs (97%) took exemptions to the school calendar, particularly the first day of school, to balance semesters and improve alignment with university and other calendars (Texas Education Agency[b], n.d.). However, 87% of DOIs also took exemptions allowing them to waive teacher certification requirements, citing financial constraints and teacher shortages. A substantial share of DOI districts (44.0%) claimed exemptions to minimum class sizes and maximum student teacher ratios.

Implications of Local Control

Attributable in part to the speed with which DOI reforms have been adopted, organized opposition to DOI districts has been relatively limited. Teacher organizations have generally expressed reservations about the implications of the law (e.g., Texas Classroom Teachers Association, 2017-18). Additionally, critics have often expressed concerns about similar legal exemptions in the context of charter schools. Indeed, much of the research base on the benefits of the exemptions allowed by Texas' DOIs is limited at best. For example, scholarship has consistently documented associations between teacher preparation and certification and student outcomes (e.g., Clotfelter, Ladd & Vigdor, 2007; Darling-Hammond & Bransford, 2005). Moreover, evidence from Tennessee and Wisconsin suggests that smaller classes are significantly and causally related to student outcomes (e.g., Biddle & Berliner, 2002). As such, there is reason for concern about the impact of such a policy focused on sweeping reductions in state oversight of education.

As local control overrides state regulation in DOIs, it is essential that researchers, policymakers and educators remain vigilant about the impact of these exemptions—particularly as it relates to removing legal safeguards designed to protect students and reversing policies demonstrated to be positively linked with student outcomes (e.g., class sizes, teacher preparation and certification, time in school). In particular, DOIs present a variety of equity-related concerns that warrant further scrutiny. For example, have DOIs led to more low-income students being taught by uncertified teachers? To more students of color being taught in larger classes? Ensuring that DOIs do not worsen already extreme patterns of inequality by race and class will require sustained attention of stakeholders.

At the state level, clear monitoring and standards should be put in place to ensure that districts are not eligible for a renewal of their DOI status if their exemptions have had negative effects on students and teachers. If, however, the policy is associated with unambiguous positive outcomes for students, under current policy the schools most in need of reform (those rated below a 'C') will be excluded from these benefits. In this case, the state should consider allowing underperforming districts, which arguably might benefit most from such exemptions, to become eligible DOIs.

As the sunset clause for DOI designations comes due in a few years, more research is needed to examine the impact of the first wave of exemptions as well as the implications of local instead of state control. As such, it is critically important to direct public and scholarly attention to this profoundly influential policy. Before DOIs become even more deeply entrenched in Texas, it is crucial that school leaders recognize the consequences of DOI reforms for the communities they serve.

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Rural Ways of Knowing in Higher Education

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Rural Ways of Knowing in Higher Education

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The *Texas Education Review* (2017) special issue on "Rural Students and Higher Education" catalyzed the following reflections on rural ways of knowing in higher education. Although articulated in different terms, a core theme throughout that critical issue is the need for colleges and universities to better understand the *vital sense of place* that underlies rural ways of knowing in higher education. For instance, Gillon (2017) noted that limited attention has been given to the "role of place as a challenge to accessing higher education and the ways in which place informs social systems and identities as they relate to post-secondary educational opportunity" (p. 10). Further, Moon-Longhurst (2017) drew attention to the significant influence that an "affinity for a place and affection for the particular qualities of that place" (p. 24) has on the higher education decisions of people in rural communities. Collectively, the perspectives in the *TxEd* special issue affirm a need for further attention to place-based ways of knowing in higher education systems.

For the purpose of this article, ways of knowing refers to how students perceive and understand themselves within their environments (Gurm, 2013). Combining ways of knowing with the person-place bonds of place attachment (Scannell & Gifford, 2010), I argue that place-based ways of knowing are often misunderstood in mainstream colleges and universities. In addition to considering the literature cited in this article, these reflections are informed by first-hand experiences working with rural colleges and universities in Hawaii, Iowa, and Pennsylvania, and across Western Canada. Ultimately, I suggest that the Spiral Dynamics model (Beck & Cowan, 1996) offers a useful lens to understand place-based ways of knowing in higher education. The model allows colleges and universities to better understand students who are "coming to the university" from environments where higher education is not already embedded into the everyday cultural ecosystems.

Rural Students and Higher Education

In the *TxEd* special issue, Stone (2017) broadly synthesized some of the key challenges and opportunities rural college students face, and pointed out the limited research on this critically important topic. The gap in the literature is especially apparent for research on rural students who have already entered college. In the same special issue, Gillon (2017) further demonstrated the significant research gaps pertaining to rural higher education. For example, she noted a gap in the literature stating that during a 13-year span, a leading journal in higher education and student affairs, *The Journal of Student Development*, published only two articles that solely focused on rural students in higher education. Her article offered a compelling glimpse into the college-going experiences of rural students. Noting how place is overlooked in understanding educational opportunity in rural communities, she pointed out that "the problem for rural students may not be just about specific barriers preventing them from accessing college, but whether they even consider post-secondary education as a possibility" (Gillon, p. 10). Also in that special issue, Moon Longhurst's (2017) research demonstrated how place attachment, including family ties, closeness to nature, and community qualities, is influential in the college-going decisions of rural community college students. These findings resonated with my own research, which found that the enrollment decisions of rural and indigenous college students were strongly influenced by the practicality of place and community sentiments, often tied to family responsibilities (Almond, 2014). In short, a vital sense of place greatly shapes the higher education trajectories of many rural students.

For rural students, going to college is often challenging in large part because of an external institutional perspective that precludes place-based ways of knowing. Given the prevailing urban-centric frameworks common across higher education systems, colleges and universities often misunderstand the lived experiences of rural students. As Gillon (2017) noted, "…[l]ittle attention is given to structures and systems that have created environments in which rural people, places, and communities attempt to exist in an urban-centric society" (p. 13). Consequently, the vital sense of place commonly held by students from rural communities is sometimes grossly misplaced in the everyday cultural ecosystems of higher education. Since the person-place bonds of place attachment are often ignored in academia, it is unsurprising that rural students often experience tensions between higher education and being pulled back to their home communities (Stone, 2017). These community sentiments and place-based attachments are commonly the main factors in the college-going decisions of rural students (Pretty, Chipue, & Bramston, 2003; Almond, 2014; Moon Longhurst, 2017).

For prospective students from rural communities, this vital sense of place might firstly mean asking themselves: "How would going to college impact my family, community, and work responsibilities?" Without recognizing this vital sense of place and the importance of staying local (Moon Longhurst, 2017), higher education systems might simply misplace place-based ways of knowing as student inadequacy. To demonstrate, a college administrator may view a prospective student who is unwilling to leave her hometown because of her strong familial roots and local traditions as weakness. Similarly, a rural student who leaves college to financially support their family during harvest time or hunting season, like the college graduate who returns to his hometown for blue-collar work, may be misunderstood in academia. This disconnect between how colleges and universities often perceive rural students and the actual lived experiences of these students is supported through understanding place-based ways of knowing.

Place-Based Ways of Knowing

Colleges and universities would benefit to shift from the institutional perspective of "coming to the university" to the student's perspective of "going to the university" (Kirkness & Barnhadt, 2001). This shift would support higher education institutions to recognize and respect place-based ways of knowing. Shaped by a vital sense of place, rural students often experience "going to the university" in very different ways compared to students from environments where higher education is already embedded into the everyday cultural ecosystems—that is, where going to college is normal (Almond, 2014).

I can personally and professionally relate to this experience. Growing up near a small town in Saskatchewan on the Canadian prairies, I noticed that townspeople and country folk alike simply did not talk about college; higher education was not part of our day-to-day conversations. Later, when I started working at small town colleges and universities in Alberta, British Columbia, and the Yukon, I started to formulate ideas about rural ways of knowing in higher education. One assignment was especially influential in this formulation. At the time, I was a faculty member tasked with building learning communities in an oil camp in a remote region of Northern Canada. I quickly realized that the educational aspirations of most camp residents reflected the very concrete ways of knowing of industrial age societies, which starkly contrasted the highly subtle information age ways of knowing that anchor mainstream colleges and universities. Drawing on the Spiral Dynamics model (Beck & Cowan, 1996), the trajectory from hunter-gatherer, to agricultural, to industrial age, to information age societies and beyond point to increasingly subtle ways of knowing that are less attached to a vital sense of place.

Reflecting on these observations, I also recognized differences between the ways of knowing held within mainstream colleges and universities and the place-based ways of knowing found in many indigenous communities across North America. For example, in his ethnographical study of indigenous people of the Dene Tha nation in Northern Canada, Goulet (1998) contended that power in indigenous communities comes from multiple sources, including interactions with animals and through dreams. Clearly these place-based and metaphysical sources stand in stark contrast to the empirical ways of knowing that anchor conventional higher education systems. It is important to build common ground between western scientific knowledge systems and the holistic orientation of indigenous knowledge systems (Barnhardt & Kawagley, 2005). These authors noted that "[t]he depth of indigenous knowledge rooted in the long inhabitation of a particular place offers lessons that can benefit everyone, from educator to scientist" (p. 9). Similarly, it is useful to build common ground between rural, place-based ways of knowing and mainstream higher education systems—common ground that is rooted in mutual understanding.

The parallels with rural ways of knowing and indigenous ways of knowing are rooted in place. Drawing further on indigenous knowledge systems, Kirkness and Barnhardt (2001) called for colleges and universities to relate to indigenous students firstly in human terms. This is important because impersonal, institutional knowledge systems that view the underrepresentation of indigenous students in higher education in terms of inadequacy—e.g. low achievement, weak persistence, poor retention, high attrition, etc.—means the onus for adjustment is on students, not colleges and universities (Barnhardt & Kirkness). In building common ground across multiple ways of knowing, these authors called for higher education systems to *respect* indigenous students for who they are; to ensure education is *relevant* for how indigenous students view the world; to offer *reciprocity* in their relationships; and to help indigenous students exercise *responsibility* over their lives. The authors asserted that:

> The most compelling problem that First Nations students face when they go to the university is a lack of respect, not just as individuals, but more fundamentally as people. To them, the university represents an impersonal, intimidating and often hostile environment, in which little of what they bring in the way of cultural knowledge, traditions, and core values is recognized, much less respected. (p. 8)

As I visited campus after campus across North America, it seemed to me that these "four R's" also applied to students from rural communities, whose ways of knowing, like students from indigenous communities, were often not grounded firstly in the western scientific values held within mainstream higher education systems, but in a vital sense of place. By respecting rural and indigenous students' existing ways of knowing, colleges and universities can ensure that education is relevant to students' worldviews and the life conditions of a particular place. As stated by Native Hawaiian scholar Manulani Aluli Meyer, "[w]e communicate through our worldview shaped within knowledge systems prioritized by the needs of people and the lessons of place" (2013, p. 1). Reciprocity in relationships can be demonstrated through comprehensive educational models that embrace relationships tied to this vital sense of place (e.g. community-based learning). By including place-based ways of knowing in mainstream colleges and universities, students might actively participate in exercising responsibility in their lives.

Spiral Dynamics

The Spiral Dynamics model (Beck & Cowan, 1996) offers a useful framework for higher education systems to shift from an institutional perspective to a more personal perspective that dignifies place-based ways of knowing. Don Beck, a native Texan and former professor at Northern Texas University, is at the forefront of this human development model based on the pioneering research of psychologist Clare Graves. The Spiral Dynamics model is concerned with the cultural memes that shape multiple worlds. In clearly identifying how multiple ways of knowing, values, and worldviews spiral together, this stage-based model "describes and makes sense of the enormous complexity of human existence, and then shows how to craft elegant, systemic problem-solutions that meet people and address situations where they are" (World Business Academy, n.d.).

In the Spiral Dynamics model, the progression of values from traditional to modern to post-modern and beyond are represented by different colors (Beck & Cowan, 1996). Often applied in racially-charged cultural ecosystems, the colors—beige (i.e. instinctive self), purple (i.e. magical self), red (i.e. impulsive self), blue (i.e. rule/role self), orange (i.e. achiever self), green (i.e. sensitive self), and so on—emphasize the color of cultural memes, rather than the color of people's skin (Wilber, 2000). Whereas many human development models emphasize the more exterior characteristics of people (e.g. fixed demographics, socioeconomic class, race, etc.), the Spiral Dynamics model focuses on the more interior qualities of people (e.g. malleable psychographics, values, worldviews, etc.) that shape motivations and actions. Consequently, each color points to distinct interior qualities in people, which when recognized, can be respected and dignified amidst multiple ways of knowing. In addition to its utility in overhauling education systems, the Spiral Dynamics model was successfully applied in the transition from apartheid to democracy in South Africa (Wilber).

To illustrate the utility of the Spiral Dynamics model, I close with further details on its application in South Africa. During the 1980s, Beck made more than 60 trips to South Africa to consult with leaders, including President Nelson Mandela (Butters, 2015). The Spiral Dynamics model removed attention from conflict between races to emphasize different value systems: "In a particular situation, it is no longer "black versus white," but perhaps blue versus purple, and orange versus green, and so on" (Wilber, 2000, p. 8). Recognizing and respecting these interior qualities was a first step towards mutual understanding. The next step involved concrete actions to build common ground between these different value systems. As portrayed in the movie *Invictus* (Eastwood, 2009), supporting a shared athletics team—in this case, the 1995 South African rugby team—was used to bridge different ways of knowing, values, and worldviews, and to begin to mend racial divisions.

Conclusion

Rural, place-based ways of knowing are often misunderstood in mainstream colleges and universities. Indeed, a vital sense of place greatly shapes the higher education trajectories of many rural people. The person-place bonds of place attachment, coupled with the reality that higher education is often not embedded into the everyday cultural ecosystems of rural communities, creates a lived experience for rural students that is often misplaced in academia. In Gillon's (2017) words:

> … the physical ways in which college manifests itself via large buildings, campus signs, athletic facilities, and students walking to and from class are often absent from rural peoples' everyday lived experiences. In other words, rural students do not grow up seeing and

> experiencing college in their own towns. College is something that happens elsewhere, possibly in a place they have never visited. (p. 17)

The Spiral Dynamics model offers a lens for colleges and universities to better understand students who are "coming to the university" from environments where higher education is not already embedded into the everyday cultural ecosystems. Using this model might help these institutions to better *respect* rural students for who they are; ensure that education is *relevant* for how rural students view the world; offer *reciprocity* in their relationships; and help rural students exercise *responsibility* over their lives.

DEVON ALMOND has worked with various rural and remote-serving colleges and universities across North America, spanning from the Yukon Territory to Hawaii Island. He has also visited hundreds of small town colleges across Canada and USA. Devon's guiding purpose—to facilitate a sense of purpose in education, a sense of place in life, and a sense of meaning in work—is influenced by his professional background in conventional and alternative higher education.

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