



TEXAS EDUCATION REVIEW

Spring 2019

Volume 7, Issue 2

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TEXAS EDUCATION REVIEW

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Welcome to Volume 7, Issue 2 (Spring 2019) of the *Texas Education Review* (*TxE*d).

This issue contains five manuscripts, including: an exploration of policies related to arming school personnel in Texas (Isbell et al.); an empirical study on access to dual enrollment in the United States (Rivera et al.); a conceptual piece related to the critical role that Ethnic Studies plays with regards to emancipatory social transformation (Armonda); an analysis of literature to gain understanding about the way literacy can be used to enact critical pedagogy and scientific inquiry (Daly-Lesch); and an examination of web accessibility of postsecondary institutions in Texas (Taylor).

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 non-exclusive 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.



*Arming Teachers for School Safety:
Providing Clarity for State Policies*

LAURA ISBELL

Texas A&M University—Commerce

KATHRYN DIXON

Texas A&M University—Commerce

APRIL SANDERS

Spring Hill College

To cite this article: Isbell, L., Dixon, K., & Sanders, A. (2019). Arming teachers for school safety: Providing clarity for state policies. *Texas Education Review*, 7(2), 6-13.

<http://dx.doi.org/10.26153/tsw/2281>

Arming Teachers for School Safety: Providing Clarity for State Policies

LAURA ISBELL

Texas A&M University—Commerce

KATHRYN DIXON

Texas A&M University—Commerce

APRIL SANDERS

Spring Hill College

In early 2018, following the tragic shooting deaths of 14 students and three teachers at Marjory Stoneman Douglas (MSD) High School in Parkland, Florida, students across the nation began to rally against gun violence in their schools in ways the country has never witnessed. This particular shooting, which occurred almost 19 years after the Columbine High School shooting, mobilized students and emboldened a movement after a group of MSD students began to publicly call for action from fellow students, legislators, and the adults whom they believed should be keeping them safe. Survivors spoke out via social media, in addition to television and print media, calling for legislative changes to prevent future gun violence in schools. Other responses from legislators, as well as concerned citizens, had a different focus—arming school personnel to respond with force to eliminate the threat in an active shooter situation or to act as a last line of defense by protecting students with a firearm in the classroom. This response was quite different from the reactions of most students who had lived through the trauma of a gunman in the hallways of their school, but the call to arm teachers, or at least staff members working in the school, became a central focus for some who are at the epicenter of policy-making in our country.

Policies that allow for arming teachers vary across the United States because they are written at the state level and implemented at the local school district level, rather than the national level. No one policy or formula for policy exists, but similarities are present in these laws that are often labeled as “School Marshal” or “Guardian” policies (Texas Senate Select Committee on Violence in Schools and School Security, 2018). Texas is one such state where these types of policies are currently implemented at the district level and are the topic of much debate. Arming school personnel or bringing guns into schools as a way to counter school shootings elicit strong reactions on both sides of the debate. In a 2018 survey by the National Education Association, 64% of the respondents said they would feel less safe if faculty/staff were armed, and 82% responded that they would not carry a gun (NEA, 2018a; 2018b). A Gallup poll conducted during the same time period echoes the same results with 73% of teachers opposing being armed (Brenan, 2018). Lawmakers in each state are also debating how or if to arm school faculty/staff, and in 2019, the Texas State Legislature introduced nine bills, which was more than any other state, related to guns in schools (Education Commission of the States, 2019). Since Texas is on the forefront of making such legislation, the laws and enacted programs could serve as a template for other states. By looking at how Texas is finding a way to arm faculty/staff, an understanding can be formed regarding similar laws being written in several other states. As gun violence increases in schools (K-12 School Shooting Database, 2019), the call to arm faculty/staff will continue to be on the forefront of the debates, and all stakeholders (i.e., teachers, students, administrators, and parents) should be aware of how these policies are written and the intent behind putting guns in the hands of the very people entrusted to teach multiplication, chemistry equations, and reading. In this editorial, we aim to bring awareness of the types of

legislative initiatives currently being introduced to these very stakeholders so that they might be able to discern which policies should receive their support and which should be opposed.

School Marshal Plan and Guardian Plan in Texas

Texas Governor Greg Abbott released his proposal "School and Firearm Safety Action Plan" for Texas school districts in May 2018—less than two weeks after the Santa Fe High School shooting in Santa Fe, Texas, that killed eight students and two teachers. This action plan, however, was not the first time that Texas lawmakers had responded to school shootings with policy initiatives. In fact, almost a decade earlier in 2007, what is now commonly referred to as the “Guardian Plan” (School Safety Training; TX Code 411.1901), was created following the Pennsylvania Amish School shooting and the Virginia Tech shooting. Several years later in 2013, the Texas Marshal Plan (Protection of Texas Children Act; TEC 37.0811) was introduced in response to the killing of 28 children and educators at Sandy Hook Elementary in Newtown, Connecticut. Both of these plans passed through the Texas legislature and were in effect prior to the 2018 Santa Fe school shooting, but each plan has a different focus.

The Guardian Plan (School Safety Training; TX Code 411.1901, 2007), for example, requires participants to go through 16 hours of training by a certified instructor and requires a strict live fire qualification that includes simulation training. This training focuses solely on stopping an active shooter. The sole purpose of this plan is to train and equip educators with the ability to serve as the last line of defense and protect the school environment until law enforcement arrives. The local school board members solely select those participating in the plan; no other specifications exist for the selection and training of these participants. This process varies by school district because school boards can determine their own selection process and criteria due to the vague language of the law. Typically, school boards hold closed door meetings to study the issue, evaluate the district needs, and discuss how the policy would be implemented if passed. If the school board decides to bring a policy up for a vote, a public meeting is legally required to allow for constituents to hear the proposed policy and provide comments for or against. It is important to note that aspects of districts’ potential plans that fall under these state codes are often kept confidential due to efforts to protect the identities of guardians and school marshals. Therefore, the public is not privy to details that pertain to the selection, qualifications, and training outcomes of individuals who serve as guardians or school marshals.

The School Marshal Plan (Protection of Texas Children Act; TEC 37.0811, 2013) allows educators to act as armed security guards in the absence of police personnel. Those participating in this plan complete 80 hours of mostly classroom instruction provided by the Texas Commission on Law Enforcement (TCOLE), thus the training is held at an approved Policy Academy training facility. Volunteer participants for this plan are chosen by school board members and must qualify to have a license to carry a handgun (TX OCC § 1701.260, 2017). Additionally, volunteers go through psychological testing to establish that they are fit to carry out the duties of a peace officer, which include arrest procedures, the use of force, and handgun proficiency. Trained individuals are expected to keep firearms in a secured and locked safe box.

The Governor’s School and Firearm Safety Action Plan includes a recommended expansion of the School Marshal Plan that would allow teachers and staff to carry guns inside schools. Governor Abbott proposed this plan after meeting with school officials and law enforcement in the days following the Santa Fe shooting (Abbott, 2018). On the day following this meeting, the Governor led a series of roundtable discussions about mental health and firearm safety. One central idea was present during the Governor’s presentations: “The discussion focused on policies that could increase the safety of schools and communities while preserving Second Amendment rights” (Abbott,

2018, p. 2). The Texas Education Agency (TEA) was directed to issue a letter to all public schools in Texas asking them to identify faculty/staff to participate in this program, and training began in the summer of 2018 (Abbott, 2018, p. 7). At the time, the law provided for one school marshal per 200 students, and the plan proposed by the governor would allow one school marshal per 100 students. Additionally, the Governor proposed a policy change to allow firearms to be carried on the school marshal's person instead of being kept in a locked box. One criticism of the School Marshal Plan has been the burden of attending an 80-hour training session, with another being the lack of customization of training to school shootings and/or the type of district. The new proposal would streamline the training to include fewer hours with yearly refresher courses provided.

The Governor's plan proposed other aspects of school safety such as prevention and threat assessment. Gun legislation was briefly addressed with the call to limit access to guns for students labeled as a threat or with known mental issues. The Governor's proposal was a major focus at the Senate Special Committee hearings in June 2018 when the Lieutenant Governor formed the Senate Select Committee on Violence in Schools and School Security. Committee members heard testimony addressing mental health and "red flag" laws. "Red flag" laws, or Emergency Risk Protection Orders (ERPOs), allow law enforcement to intervene and temporarily remove firearms from an individual if a judge deems the person to be of danger to him/herself and/or others. In the end, the committee recommended that the state increase funding for school marshal programs (arming certified faculty/staff), but members did not propose implementing "red flag" laws (Senate Select Committee on Violence in Schools and School Security, 2018). Clarity was not provided by the special committee on how the training would be streamlined, and the only major change from the committee's recommendations and the Governor's plan was the lack of support on stricter gun legislation ("red flag" laws).

During the 86th Texas Legislative session in Spring 2019, multiple bills were introduced to modify the requirements for school marshals and a few of those bills were passed by the Senate. Texas Senate Bill 244 would remove the current cap of one school marshal per 200 students and would allow schools to appoint "one or more school marshals for each campus" (Texas S.B. 244, 2019). Although S.B. 244 was left pending in the House Public Education Committee, a companion bill in the House gained more traction. House Bill 1387, which initially would reduce the restriction on the number of school marshals allowed from one marshal per 200 students to one marshal per 100 students, was amended to allow "one or more school marshals for each campus" (Texas H.B. 1387, 2019). The amended version of H.B. 1387 passed through both the House and Senate and was signed into law by Governor Abbott.

Senate Bill 406 and Senate Bill 243 would allow school marshals to carry firearms on their person instead of requiring firearms to be locked in a secure location if the school marshal is in direct contact with students. S.B. 243 was left pending in the House Homeland Security Committee without a hearing and S.B. 406 was also left pending following the House Homeland Security Committee hearing. Therefore, school marshals are still required by law to secure their firearms in a locked location. The bills put forth during the 86th Legislative session did not appear to address training requirements for school marshals or other district personnel appointed to carry and/or use firearms on campus.

Senate Bill 11, the most comprehensive bill introduced to address school safety, included many of the recommendations put forth by the Senate Select Committee on Violence in Schools and School Security. While this bill attended to numerous preventative measures from mental health, suicide prevention, and digital citizenship to school curriculum requirements, trauma-informed care and curriculum, and threat assessment teams, it also authorized funding for private security, school resource officers, and school marshals. S.B. 11 was passed by both the Senate and the House and was signed into law by the Governor.

Finding a Safe Solution

The response to gun violence in schools across the United States has been varied, but one commonality is the lack of clear, consistent plans to prevent, prepare, and react in the event of a school shooting. As a result, school safety measures in general, and arming school personnel in particular, is being decided on a state by state basis; currently, 10 states have policies or laws in place addressing the arming of faculty/staff (U.S. Department of Education, 2018). Many more states (up to 21 states) allow school personnel to have access to guns if needed (National Conference of State Legislatures, 2018). The legislative response in Florida (after the Parkland shooting) regarding arming teachers has been more specific than other states to date in that classroom teachers are excluded if they solely perform classroom duties, unless the classroom teacher is part of the Reserve Officers Training Corp (ROTC). Florida Senate Bill 7026:

[A]llows school districts to decide whether to participate in the school guardian program if it is available in their county. A school guardian must complete 132 hours of comprehensive firearm safety and proficiency training, 12 hours of diversity training, pass a psychological evaluation, and initial drug test and subsequent random drug tests. No teacher will be required to participate. In fact, the legislation provides that personnel that is strictly classroom teachers with no other responsibilities cannot participate, with specified exceptions (FL S.B. 7026, 2018).

In May 2019, the Florida legislature passed FL S.B. 7030, which is an expansion of S.B. 7026 that allows for any classroom teacher or school personnel to be considered for the guardian program and receive training from the county sheriff. At this time, no school requires faculty/staff to be armed while on campus (U.S. Department of Education, 2018).

Many districts argue that such varied policies and procedures are needed because a one-size-fits-all approach will not work for all districts, and that local control of policy is key to addressing different situations that arise. For example, rural schools theoretically do not have the same quick response time as urban and suburban schools such as MSD in Parkland, and therefore, might need more armed personnel on campus (U.S. Department of Education, 2018). The states that do have laws in place to arm school personnel typically have some level of training provided for participants, although the type, length, and who conducts the training varies. The Federal Commission on Student Safety released a 177-page report in December 2018, identifying recommendations and resources for keeping schools safe. The report outlined three broad categories: (1) prevent, (2) protect and mitigate, and (3) respond and recover (p. 13). Information taken from administrators, teachers, students, families, and state and local policymakers was used to identify the recommendations outlined by the committee (U.S. Department of Education, 2018). The arming of school personnel is discussed under the second category and only provides some considerations regarding the specifics of that community and state law. No additional guidance is provided. Few states have specific programs in place (or being designed), but there is considerable interest across the country for such programs to exist. Other programs in place include the South Dakota School Sentinel Training Program, the Alabama Sentry Program, and the Arkansas Commissioned School Security Officer program (U.S. Department of Education, 2018). Since so few programs currently exist, viewing the evolution of programs like the ones being shaped in Texas gives considerable insight into what other states could enact in the near future.

Gun violence in schools is a complex problem that will need to be approached with multifaceted solutions. Productive dialogue surrounding school safety and the prevention of gun violence in schools requires that stakeholders fully understand laws and policies already in place, as well as the content of proposed legislation. The notion of arming teachers and other school personnel as one solution is controversial and the topic of much debate. In addition to the issue of vague and unclear policies, there is a lack of research and data on the effectiveness of programs that include arming

teachers and school personnel on the prevention or interruption of active shooter situations in schools. Relatively little attention has been paid to the fact that these policies come with the expectation that teachers are able to instantaneously switch from classroom teacher to expert marksman in the chaos of an active shooter situation with panicked students in their presence. Research shows that regularly trained law enforcement officers' accuracy rate in active shooter situations ranges from 18% to 43% (Rostker, et al., 2008). The low accuracy rates are most often attributed to the high stress elements of these encounters (Lewinski, et al., 2013; Vickers & Lewinski, 2012) and are not a regular focal point of legislative hearings. The outcry from students for much-needed protection has been interpreted by legislators as an opportunity to arm faculty/staff, but understanding the reality of implementing such programs must be understood and evaluated by those who will actually carry guns—the teachers.

Laura Isbell, Ph.D., is an Assistant Professor at Texas A&M-Commerce University in the Curriculum & Instruction department. She is an advisor and Master's program coordinator in the Curriculum & Instruction department. Her research interests include teacher preparation, teacher quality, academic and behaviorally interventions, and educational policy.

Kathryn Dixon, Ph.D., is an Assistant Professor of Curriculum and Instruction, specializing in Literacy at Texas A&M University - Commerce. She teaches undergraduate and graduate courses in literacy education. Her research interests include education and language policy and preservice teacher development of culturally responsive teaching mindsets.

April Sanders, Ph.D., is currently an assistant professor at Spring Hill College in Mobile, Alabama, and specializes in research related to literacy applications in the K-12 classroom and preservice teacher development.

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*Access to Dual Enrollment in the United States:
Implications for Equity and Stratification*

LUIS E. RIVERA

The University of Texas at El Paso

STEPHEN KOTOK

St. John's University

NATHAN ASHBY

The University of Texas at El Paso

To cite this article: Rivera, L.E., Kotok, S., & Ashby, N. (2019). Access to dual enrollment in the United States: Implications for equity and stratification. *Texas Education Review*, 7(2), 14-29.

<http://dx.doi.org/10.26153/tsw/2282>

Access to Dual Enrollment in the United States: Implications for Equity and Stratification

LUIS E. RIVERA*

The University of Texas at El Paso

STEPHEN KOTOK*

St. John's University

NATHAN ASHBY

The University of Texas at El Paso

*Note: Equal Contributions by Authors

Dual credit and dual enrollment (DE) programs are now offered at more public high schools in the United States than Advanced Placement (AP), and these courses are increasingly popular among both high academically achieving and average students (Thomas, Marken, Gray, & Lewis, 2013). DE and dual credit (hereby called dual enrollment) refer to coursework taken by high school students, which simultaneously confers them high school and college-level credit upon successful completion. Currently, all states offer some form of DE (Education Commission of the States, 2016) and about a third of students take classes for college credit during high school (National Center for Educational Statistics, 2019). Although other curricular alternatives such as AP or International Baccalaureate (IB) remain available in many districts, school leaders increasingly view DE programs as a means to improve college preparedness as well as a way to promote post-secondary access for disadvantaged students since it does not require the passing of an AP test for credit (Kryst, Kotok, & Hagedorn, 2018). However, states and school districts vary widely when it comes to which students have access to DE and who participates in the courses. Many heavily rural states utilize DE as a substitute for honors or advanced placement courses, while other jurisdictions view DE as a way to expose economically disadvantaged and minority students to post-secondary options (Kryst, Kotok, & Hagedorn, 2018; Education Commission of the States, 2016).

The aim of our research is to analyze DE participation in the United States in the current policy context to understand the distribution of DE access. Although extant research examines DE access and academic advantages at the state or district level (Haskel, 2016; Lichtenberger et al., 2017; Troutman et al., 2018), few, if any, recent studies examine DE access using nationally representative student-level data. National studies of DE either focus on the aggregate school or state-level data (Marken, Gray, & Lewis, 2013; Thomas et al., 2013) or utilize much older data on individual high school students, such as National Education Longitudinal Study of 1988 (NELS:88) (An, 2012; Swanson, 2007). These older and aggregate studies are able to capture the strong relationship between DE with post-secondary educational and occupational outcomes. However, DE policies and policy discussions have shifted immensely in the last 30 years (since NELS:88) with equity and access now being paramount goals in many DE initiatives in contrast to prior so-called merit based goals, which perpetuated a system of tracking that favors students from higher socioeconomic statuses (SES). In order to examine current trends in DE across the U.S., we use the High School Longitudinal Study of 2009 data set (HSL: 09), the most recent nationally representative sample of high school students. Such an analysis sheds light on this form of advanced coursework in a national context and helps school leaders see where gaps in accessibility occur. This study makes a valuable contribution to the literature by providing a snapshot of DE participation and helping researchers think through a DE research agenda to reflect these current trends of enrollment and to promote access.

In order to appreciate the role of DE in the 21st century high school, we first discuss the history of dual enrollment and the current policy context across the United States. Subsequently, we review literature on who takes DE and then we situate DE literature into different educational values connected to human capital development (equity, efficiency, and excellence). This study contributes to the literature by providing a description of who actually takes dual enrollment, which is important to understand at a time when districts and states continue to expand DE programs.

Background on Dual Enrollment

Historical Context of Dual Enrollment

DE was first implemented in the United States in the late 1970s as an option for students wanting to take rigorous coursework that would allow them to obtain college-level credit. Many states enacted policies facilitating high school students' course taking at local community colleges, and Minnesota is considered a pioneer in implementing one of the first statewide DE policies. Gradually, DE programs and policies emerged in more states (Boswell, 2001). Although states pursue DE for various reasons, Mokher and McLendon (2009) suggested that states were more likely to enact DE policies if they had an active community college lobbying network, Republican legislatures, and other educational market reform policies (e.g., K-12 vouchers).

Currently, forty-seven states and the nation's capital have statutory provisions and regulations ruling over one or more statewide DE programs or policies. The remaining three states leave DE policies to the discretion of localities and their pertinent postsecondary institutions or systems (Education Commission of the States, 2016). Growth in DE programs and policies have been aggressive in recent years. The National Alliance of Concurrent Enrollment Partnerships (NACEP) states that DE had an annual growth of seven percent from 2003-2011, and that four out of five high schools now offer college-level courses (NACEP, n.d.). In the state of Texas alone, the number of students taking DE soared from around 42,000 in 2000 to over 150,000 by 2017 (Troutman, Hendrix-Soto, Creusure, & Mayer, 2018). In 2015, California passed a series of laws to expand DE, such as expanding the limit of credits students could receive and allowing tuition-free community colleges to teach courses on site at high schools, resulting in a large increase in DE courses and students (Ogul, 2019). Therefore, it is reasonable to believe that given the progressive adoption of DE across the United States, it is also becoming institutionalized (Kilgore & Taylor, 2016).

Funding and support for advanced coursework exists in major federal education reform and mandates. President Barack Obama's administration supported advanced coursework by proposing that Pell Grants be extended to cover DE courses (U.S. Department of Education, 2016). There has been both bipartisan congressional support and backing by Secretary of Education Betsy DeVos for DE (Klein, 2017). In fact, Secretary DeVos views DE as part of her chief priority as highlighted in her speech entitled "Empowering Families to Choose a High-Quality Education that Meets Their Child's Unique Needs" (U.S. Department of Education, 2017). In summary, DE has become widespread and a major component of U.S. higher education. However, studies of policy implementation suggest that most policies have unintended consequences and the target population for policies are not always the ones deriving the most benefit. Therefore, it is useful to examine what empirical research tells us about who is taking DE.

Who Takes DE in the United States?

States and districts vary widely in who participates in DE and other advanced coursework (Nelson & Waltz, 2019). This variance partially explains why studies exist to both support arguments

for DE as an equity measure as well as to raise concerns that DE leads to more tracking and stratification of human capital. Some states have crafted DE policies around equity and access, encouraging historically underrepresented students to take DE, while other states follow the excellence model, reserving spots only for students who maintain a high GPA, pass a college readiness exam, or receive recommendation from their teachers. States that have a GPA requirement typically utilize 3.0 as a minimum, but other states, such as Louisiana, employ a 2.0 requirement (Education Commission of the States, 2016).

Despite the best intentions of state policies aiming to increase access, prior research generally finds that DE participation maintains racial and economic stratification (Miller et al., 2017; Museus, Lutovsky, & Colbeck, 2007). Higher-SES students enroll in DE more often due to several advantages including higher-average achievement, family social capital, and the ability to pay extra fees in states where DE requires some form of payment (Miller et al., 2017). Racial disparities also continue to exist in DE programs in most states (Appleby et al., 2011; Miller et al., 2017). For instance, Freidman and colleagues (2011) found that despite DE equity initiatives in Texas, such as funding waivers, schools with high percentages of African Americans tended to have much lower DE participation.

Other possible predictors of DE enrollment include geographic location, gender, and attitudes towards education. In general, females participate in advanced coursework and attend college at greater rates than males (Handwerk, Tognatta, Coley, & Gitomer, 2008; Kena et al., 2016). DE participation also seems to mirror this gender gap with females far more likely to participate in DE. We also see geographic differences in DE enrollment. In a recent study of Texas DE, researchers found rural students always participated in DE at higher rates and that gap has increased over the last 15 years (Miller et al., 2017). For rural areas, DE is often viewed as more efficient than AP courses for a variety of reasons we explore in the next section.

This review of research about who takes DE provides us with a descriptive understanding of who takes these courses but also how these differences relate to future labor markets. Recent policy promotions of DE can be linked to economic theories. Therefore, we next analyze how DE can be viewed through a human capital theory framework as well as educational values, such as equity.

Human Capital Theory and Dual Enrollment

The vast expansion of higher education in the United States following World War II has coincided with the advent of human capital theory, the idea that individual skills and knowledge of workers hold economic value (Shultz, 1961). Human capital theorists view higher education as a means to increase individual skills for the workplace, increase individual earnings, and improve the overall economy of a jurisdiction. Some argue that human capital theory still offers a simplistic view of education by commodifying learning as purely an economic vehicle (Fitzsimons, 2015). Although these concerns are valid in considering a larger discussion on the purpose of education, human capital theory (HCT) still provides a useful lens for considering the rapid growth of DE, allowing researchers to articulate who benefits the most from these opportunities. According to Gary Becker (1994), “education and training are the most important investments in human capital,” and higher education (including DE) is in many ways the ultimate manifestation of it (p. 17).

Yet, another criticism of HCT is that it unfairly privileges certain social classes in the educational marketplace (Bowles & Gintis, 1975; Tan, 2014). Becker (1994) argued that the incorporation of HCT in socialist and communist countries is evidence that HCT has been interpreted to maximize both individual capitalistic impulses and more collective, national development. In many ways, differing DE policies in the United States offer a lens into how jurisdictions understand human capi-

tal development and whether they subscribe to a color/class blind meritocratic view or one that seeks to maximize opportunity, and thus human capital, for historically marginalized populations.

The Three Es and Why DE is So Popular

Although educational policymakers may not always make explicit reference to HCT, policy tensions reveal different philosophies on how jurisdictions should go about maximizing collective human capital. Hess (2005) described this tension as the balancing of three dominant educational values: equity (equality of opportunity), efficiency (maximizing resources), and excellence (emphasis on performance). The following literature review extends our discussion on HCT by exploring exactly how DE relates and conflicts with these three overarching concepts of educational policy.

Equity. Some education policy makers have increasingly touted DE as an effective tool to close the educational achievement and opportunity gap for low-income and minority students (Nelson & Waltz, 2019). The theoretical underpinning for these policies is a belief that DE increases equity and access by giving participants exposure to post-secondary opportunities and lightening the financial burden of college by providing them with college credit (Miller et al., 2017). When students take college-level courses during high school, it eases the academic transition into a two or four-year institution since they know what to expect of college-level courses. Participating in DE gives students a head start in both content and credits and, therefore, increases the likelihood of attaining a postsecondary degree (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007).

Indeed, empirical studies on the benefits of DE classes and programs have shown benefits to low-income, racial minority, and other underrepresented student populations (An, 2012; Haskell, 2016; Hugo, 2001). For instance, Speroni (2011) found that racial minority students were 6.1 percent more likely to attain a bachelor degree and 6.5 percent more likely to enroll in a four-year college if they enrolled in DE than minority students who did not participate in DE. Similarly, DE participation has been found to increase college enrollment and persistence for Latinos (Swanson, 2007) as well as college degree attainment for first-generation college students (An, 2012).

Excellence. The educational value of excellence and HCT overlap in aspects that emphasize the individual over the collective. Meritocracy is a term often used to describe the value of excellence. DE develops human capital by increasing college readiness (Hoffman, Vargas, & Santos, 2009) and providing rigorous college-level work for students. However, in many contexts, DE targets only most academically advanced students. In fact, the first DE policies in the 1970s and 80s followed the traditional tracking model, focusing on “affluent, gifted” students (Miller et al., 2017, p. 7). Proponents of DE as an honors-level course presume this so-called merit based DE selection to be race-, gender-, and income-neutral. In essence, DE replaces Advanced Placement for some advanced students. Other students take both DE and AP courses as a wider and advanced portfolio. Programs such as DE are especially valuable for high achieving students in schools that may lack AP courses due to a lack of resources or demand for such rigor (Thomas et al., 2013).

The opportunity to take such courses is notable given the relationship between participation in DE with high school graduation as well as post-secondary attainment (Karp et al., 2007; Speroni, 2011; Swanson, 2008). For instance, using nationally representative data, An (2012) found that DE increased probability of a student attaining any postsecondary degree by 7 percent, and students participating in DE were 8 percent more likely to earn a college degree than those who did not participate. In a study of DE students in New York City, Allen and Dadgar (2013) concluded that students who participated in DE performed better academically in college, as measured by GPAs, and graduated quicker than students who did not take DE courses.

Efficiency. In the simplest terms, efficiency refers to producing the best results with the fewest resources (Johnes, Portela, & Thanassoulis, 2017). In a HCT framework, DE allows jurisdic-

tions (schools, districts, and states) to prepare students for college and provide high-level course work, often at a minimal cost. Students may also obtain a college degree faster and cheaper if they start taking subsidized DE courses earlier in their academic careers. (Miller et al., 2017). The incorporation of DE also makes some schools and districts more efficient. Smaller high schools, particularly in rural areas, often struggle to offer Advanced Placement courses (Kryst, Kotok, & Hagedorn, 2018). Already overstretched teachers in rural districts may be asked to teach AP courses, some schools may not have AP-certified teachers, and there may not be enough enrolled students to make an AP course financially efficient (Kena et al., 2016). Whereas AP can only be taught by high school teachers, DE can be taught by either certified high school teachers or college faculty. By offering DE courses through a community college or through distance education, it lessens the number of courses that high school teachers must prepare. At the same time, the proliferation of DE in rural communities may help sustain two-year colleges in areas with smaller populations (Ashford & Dembicki, 2018).

At the state-level, however, DE may not be efficient. A fiscal analysis of DE in Florida, Ohio, and Georgia revealed that DE did not save any money and caused two of the three states to spend more money (Roza & Brooks, 2017). In these two cases of financial losses, states were providing state funds for both the school district and the community college. Moreover, districts were spending more on DE than AP since they often paid student fees and/or provided transportation to the community college. Yet, it is important to note that the authors of the fiscal analysis point out that much of this inefficiency is a function of the policy design rather than an inherent cost of DE. For instance, the Early College High School Model—a magnet-like school that allows students to take several college courses on their campus—often provides DE on site, and many other traditional high schools certify their teachers as DE instructors (Kaniuka & Vickers, 2010).

Taken together, these aforementioned studies demonstrate that DE has the potential to balance equity, excellence, and efficiency for students and educational leaders. However, there are inherent tensions as to which of these values dominates and it is an empirical question as to which types of students are actually being targeted for and participating in dual enrollment. Given the benefits of DE, inclusiveness and access for underrepresented students is fundamental to the design and implementation of DE programs (Cassidy, Keating, & Young, 2010). Conversely, if DE continues to grow as an alternative to Advanced Placement, it could lead to more stratification through performance-based tracking favoring the most affluent students (Taylor, 2015). In fact, in a large study of DE in Illinois, Taylor (2015) found that while low-income and minority students derived benefit from being in DE, their participation rate lagged far behind higher-income and White peers. Taylor suggested DE is inequitable, despite promises to the contrary.

Thus, research examining the equity in the distribution of DE participation at a national level is timely and important in creating access and equity-enhancing educational policies. Although prior research guides our understanding of who participates in DE, we reiterate that no current nationally representative studies use individual data and inferential statistics to understand national trends in DE participation.¹ As a result, this study seeks to examine the following research questions:

- 1.) What individual characteristics predict participation in DE across the United States?
 - 1a) To what extent are there opportunity gaps by SES, gender, and race/ethnicity?
 - 1b) To what degree does individual achievement predict DE participation?
- 2.) To what extent does DE participation vary by school location (urbanicity and region of the United States)?

¹ See Shviji and Wilson (2019) for a nationally representative descriptive analysis or Kilgore and Taylor (2016) for a study using self-reported college data.

Methods

Data

We use publicly available data from the High School Longitudinal Study of 2009 (HSLs:09). The HSLs:09 follows a cohort of more than 24,000 9th graders from 944 high schools. So far, HSLs: 09 has released longitudinal data from the fall of 9th grade along with data from the spring of 2012 (anticipated 11th grade) and spring of 2013 (anticipated graduation). Our study mainly relies on the 9th grade data to capture demographic and school characteristics alongside the 2013 transcript data to capture DE participation throughout high school (Dalton, Ingels, & Fritch, 2018).

Variables. The dependent variable utilized is a dichotomous variable equal to one if a student has taken any DE course work during high school and equal to zero if the student has not and the estimation coefficients are presented as odds ratios. The independent variables include several demographic variables to capture equity. Socioeconomic status is a standardized composite variable based on parental education, income, and occupational prestige. The models in this paper control for gender with male students serving as the reference group. A set of dichotomous variables is included in the data set controlling for racial/ethnic groups: White, African American, Hispanic, Asian, and other race (Two or More races, American Indian and Pacific Islander). A variable was included for English Language Learner status. We also use measures to assess the tracking hypothesis that DE favors higher achieving students. Since DE enrollment can occur as early as the student's sophomore year, we control for prior achievement with overall ninth grade student GPA for academic courses. Attendance was controlled for using an ordinal variable for how many times students were absent during 11th grade year. We also included two standardized scale variables to measure student perception of engagement in school and perception of school belonging at their high school. Attitudes such as engagement and belonging have consistently been related to achievement and persistence in academically challenging courses (Christenson, Reschley, & Wylie, 2012). Several school-level variables were controlled for to assess the importance of location on DE participation. Geographic region was a categorical variable comparing the Southeast, West, Midwest, and Northeast (reference). The urbanicity variable used census-defined categories for urban, rural, small town, and suburban (reference). Finally, a variable was included for whether the school was public or private.

Analytical Approach

We used logistic regression to estimate the probability of a student enrolling in DE during high school. All results are presented in odds ratios with values above one indicating an increase in odds and those below 1 indicating a decrease in odds of enrolling in DE. Three models are presented in this paper to ascertain what student characteristics predict DE participation. In the first model, the dependent variable is regressed by individual demographics to assess the role of equity along racial and socioeconomic lines.

$$\log \left[\frac{P[\text{DE}]}{1-P[\text{DE}]} \right] = \gamma_0 + \gamma_1 \text{Female} + \gamma_2 \text{Black} + \gamma_3 \text{Hispanic} + \gamma_4 \text{Asian} + \gamma_5 \text{Other-Race} + \gamma_6 \text{SES}_U + \gamma_7 \text{ELL} + \nu$$

The second model below adds controls for 9th grade GPA, attendance, and attitudes towards school and education:

$$\log (P[DE]/(1-P[DE]))= \delta_0+\delta_1 \text{ Female}+\delta_2 \text{ Black}+\delta_3 \text{ Hispanic}+\delta_4 \text{ Asian}+\delta_5 \text{ Other-Race}+\delta_6 \text{ SES_U}+\delta_7 \text{ ELL}+\delta_8 \text{ GPA09}+\delta_9 \text{ Absent}+\delta_{10} \text{ SchEngagement}+\delta_{11} \text{ SchBelong}+w$$

The third model adds some school factors to answer the second research question in terms of locational importance:

$$\log (P[DE]/(1-P[DE]))= \beta_0+\beta_1 \text{ Female}+\beta_2 \text{ Black}+\beta_3 \text{ Hispanic}+\beta_4 \text{ Asian}+\beta_5 \text{ Other-Race}+\beta_6 \text{ SES_U}+\beta_7 \text{ ELL}+\beta_8 \text{ GPA09}+\beta_9 \text{ Absent}+\beta_{10} \text{ SchEngagement}+\beta_{11} \text{ SchBelong}+\beta_{12} \text{ Rural}+ \beta_{13} \text{ Town}+\beta_{14} \text{ City}+ \beta_{15} \text{ Public}+\beta_{16} \text{ Midwest} + \beta_{17} \text{ South}+\beta_{18} \text{ West}+\epsilon$$

All of the analyses presented in this paper use a student-level weight (W3W1W2STU) designed for longitudinal analysis across all three data collection periods. The use of the analytic weights helps to account for the study's complex survey design and allows for generalization of the findings at a national level for all high school students (Ingels et al., 2011). Lastly, all estimations in this research paper employ robust standard errors in order to address bias associated with weights and the complex, clustered nature of the data. We report McFadden’s pseudo r-squared values base for all models in to display the degree that it increases, but these values are not to be interpreted in the same manner as r-squared for Ordinary Least Squares (OLS) regression, where the value provides exact measure of variance explained (Hoetker, 2007; Pampel, 2000).

Findings

Compared to the full sample, DE participants tended to differ on demographics such as gender, race, and SES as well as achievement levels (see Table 1). For instance, over 63% of DE students tended to be White compared to only about half of the full sample. In terms of SES, DE students were relatively more advantaged. Given the equity goals of many DE policies, these trends are somewhat concerning. In terms of achievement levels, DE participants scored about half a point higher than the full sample on their 9th grade GPA. However, perhaps due to more rigorous courses, the gap shrunk to about a third of a grade point by the end of high school. In terms of attitudes, students enrolled in DE tended to report higher average levels of engagement and school belonging. Notably, rural and small town schools had a higher proportion of students enrolled in DE courses than urban and suburban schools. This makes sense given what we know from the literature that rural school leaders may see DE as a substitute for AP courses (Gagnon & Mattingly, 2016).

Table 1

Weighted Descriptive Statistics for Full Analytical Sample and DE Participants

	All Students		DE Students	
	Mean	Std. Dev.	Mean	Std. Dev.
Demographics				
% White	51.79		63.43	
% Black	13.66		8.80	
% Hisp	21.94		16.39	
% Asian	3.54		3.99	
% Other	9.08		7.37	

% Female	49.59		57.60	
% ELL	17.49		13.60	
SES	-0.07	0.76	0.16	0.75
Academics				
Absence Scale	2.544	1.09	2.35	0.98
School Belong	0.03	0.98	0.20	0.89
School Engage	0.04	0.98	0.26	0.87
9 th Grade GPA	2.56	0.95	3.09	0.77
12 th Grade GPA	2.76	0.82	3.13	0.69
School Variables				
% Public	92.86		93.12	
% City	31.89		27.20	
% Suburb	33.31		31.62	
% Town	11.73		13.22	
% Rural	23.07		27.96	
% Northeast	17.41		15.90	
% Midwest	22.16		26.45	
% South	37.54		39.10	
% West	22.89		18.55	

Source: U.S Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Longitudinal Study of 2009 (HSL: 09)

In running the regressions, we found that despite equity intentions, SES and prior achievement are the strong predictors of whether students participate in DE (see Table 2). Such a finding is not completely surprising given numerous studies documenting the correlation between SES with academic opportunities as well as the strong belief in the U.S. that opportunity stems from merit such as higher prior achievement (Sirin, 2005). In model 1, we test the extent that demographic characteristics of students predict participation in DE. Without controlling for GPA, we find that, on average, racial minorities were significantly less likely to participate in DE, while being female and higher SES was positively associated with DE enrollment. On average, a one standard deviation increase in SES increased the odds of a student taking DE by 46%. Conversely, on average, Black students were 37% less likely ($p < .001$) and Hispanics were 25% less likely ($p < .05$) to take DE courses than Whites. On average, females were more than 1.5 times more likely than males to take DE, controlling for race, language, and SES.

Table 2

Odds of Participating in Dual Enrollment

	Student Background Model	Prior Achievement Model	School Model
Female	1.539***	1.304***	1.306***
Black	0.571***	0.808	0.789
Hispanic	0.749*	1.042	1.163
Asian	0.906	0.757	0.849
Other Race	.680***	0.821	0.864
SES	1.459***	1.085*	1.169**

ELL	0.906	0.771	0.803
9 th Grade GPA		2.082***	2.093***
Absence Scale		.889***	0.895***
School Engagement		0.988	0.989
School Belonging		1.06	1.085*
Rural			1.251**
Town			1.282*
City			1.067
Public School			1.848***
Midwest			1.226
South			1.284*
West			0.890
N	14,920	13,112	13,112
Pseudo R Squared	0.043	0.083	0.092

Statistical significance as follows: *** $p < .001$; ** $p < .01$; * $p < .05$.

The findings from the second model reveal the crucial importance of prior academic achievement in the context of DE enrollment. Here, we add controls for individual achievement, attendance, and attitudes towards education as well as school. Ninth grade academic GPA significantly increased the odds of taking DE. In fact, a one-point increase in GPA doubled the odds of a student enrolling in DE. On average, as attendance problems increased, the odds of enrolling in DE decreased at a significant level. Model 2 seems to provide evidence that DE relies heavily on a perceived merit-based selection process.

In the third and final model, we add school variables to assess our second research question on locational importance and to consider individual characteristics when controlling for school factors. There is a relationship between where a student lives and DE access. Rural and town students being, on average, 25% and 28% more likely than suburban students to take DE courses. Regionally and on average, we find students in the South were significantly more likely than students in the Northeast to enroll in DE, while Midwest students were marginally more likely ($p = .053$) to participate in DE. Although not a focus of our research, it is notable that public school students were twice as likely as private school students to take DE courses.

In terms of the individual predictors, we find that perceived merit and affluence still play a factor in DE. Student SES and gender remain significantly related to DE participation in the third model while race/ethnicity is no longer significant. However, the relationship between SES and DE is only associated with a 17% increase in odds compared to almost 50% in first model, indicating SES alone is not that powerful of a factor. The coefficients for GPA and attendance remain significant and the magnitude does not change much when controlling for school factors. Notably, when controlling for school factors, the school belonging variable becomes significant, associated with a modest 8% increase in the odds of participating in DE. Overall, our analysis provides a snapshot of the characteristics of DE course takers and reveals that academic factors seem to be most important, but there are clear relationships between location and social class as well.

Discussion

Our study connects DE participation to human capital theory and related educational policy values of equity, excellence, and efficiency. DE policies have the potential for school leaders to create a more equitable pathway, but it also creates a pathway for the already advantaged students to subsidize their post-secondary education, widening the opportunity gap among students. Our study

suggests a mix of policy goals and outcomes across the United States, but DE tends to benefit the relatively advantaged students. Specifically, we find that higher SES students seem to be more likely to participate in DE. Although the magnitude of this difference was not massive, it demonstrates that DE is not necessarily closing the national opportunity gap as promised in the rhetoric (Klein, 2017). On the other hand, while racial disparities also exist in the DE pipeline, these differences seem to be mostly related to being lower-SES and having lower prior achievement since the race/ethnic gap was not statistically significant in the latter logistic models. Still, this finding is critical given the policy discussion around DE and equity and considering the research demonstrating the benefit for low-income and racial minorities (An, 2012; Haskel, 2016; Hugo, 2001). We would hope to see an overrepresentation of low-income minority students rather than a continuation of grouping and tracking practices by income and prior achievement, which often result in racial stratification.

Equity often comes at the expense of arguments for excellence as a fairer means for distributing resources. Excellence, or the so-called merit-based framework, continues to be an important aspect of human capital theory, and it appears to be more important than equity for many high schools when it comes to DE participation. DE seems to be serving as advanced work for higher-achieving 9th graders in most instances, and DE courses replace advanced placement courses for many of the highest 9th graders (although it is possible DE students are enrolled in both). The descriptive statistics and model estimations suggest that high achieving students are predominantly participating in DE. Although the GPA requirements can be as low as 2.0 in some states, the participants' ninth grade GPA around 3.1. The sample employed herein shows that GPA averages increase more over the high school years for non-participants than for DE students. In other words, GPA does not seem to change much during the high school years. Therefore, high achieving 9th graders will have a clear path to advanced coursework if they decide to take it. These findings are consistent with the roots of DE, which viewed concurrent college enrollment as opportunity for gifted students (Miller et al., 2017). At the least, excellence is being considered in conjunction with equity and may be limiting opportunities based on implicit biases associated with poverty and race.

Although the nature of our analysis makes efficiency arguments difficult, we think DE potentially complicates efficiency for both high schools and institutions of higher education. More research is needed in this area, but we are concerned that if higher-SES students are, in a sense, receiving a subsidy towards higher education completion, some lower-SES students will have to pick up the financial burden demanded from universities now receiving fewer tuition dollars. Since 9th grade GPA and SES seem to be important indicators of participation in DE, it seems that subsidizing these programs has not been effective at closing the gap and improving access for disadvantaged students. Rather than subsidizing DE for students with more affluent backgrounds, a more effective use of resources would be geared towards interventions that seek to close this gap at younger ages. Elongo et al. (2016) provide strong evidence that investment in early childhood education are important in improving the opportunities of students later in life.

On the other hand, the fact that rural areas and schools in the South and Midwest seem to be utilizing DE at higher rates than other regions suggests a possible market efficiency. The advent of DE may be offering a lifeline to community colleges in sparsely populated areas, allowing these schools to continue serving adult students as well. Certainly, more localized research on individual district budgets and outcomes could help us better understand this process.

There are also implications for gender gaps in DE. As mentioned previously, female students are overrepresented in DE coursework. This finding is parallel to work on other advanced coursework participation by Handwerk et al. (2008), which consistently found higher female student participation in a national analysis of AP participation. The gender disparity in advanced coursework participation, such as DE and AP, should be of concern to policy makers as it suggests that the gender

college gap is also present among high achieving students. More research is needed in this area to better understand the contributing factors for why females are so much more likely to participate in DE.

Limitations

Although this study adds greatly to our understanding of DE by using the most recent nationally representative sample of high school students, it sought out primarily to provide a snapshot and has some limitations. HSLs: 09 DE variables do not offer any specific insights about the content, quality, or other relevant aspects of DE coursework delivery. In using the publicly available data, we are unable to measure some school-level variables such as school-SES and we are prevented from using multi-level approaches. However, the high-level of significance and use of robust standard errors alleviates some of the limitations of the publicly available data. Moreover, our finding regarding the relationship between urbanicity as well as region with DE provides valuable insights in the distribution of DE participation across the U.S. Another limitation of this study is that we are not examining if participation leads to positive outcomes for students such as high school and college attainment. Although the relationship between DE has been well established, future research should continue to examine how DE affects these outcomes as policies evolve. However, given this new era of equity focused DE policies, this study makes a valuable contribution by concentrating on who actually has access to DE. Moreover, in using HSLs: 09, we could examine enrollment across the United States and start to understand the geography of opportunity.

Conclusion

Despite some limitations, this study enhances our understanding of access to dual enrollment. This paper set out to examine the characteristics of student populations participating in DE. As previously discussed, a concerted effort to provide access to DE to disadvantaged students is underway across the country. Because public funding and school districts are the main financiers of DE programs, it is then pertinent to understand if the equity goal is being achieved. The estimations presented in this paper leave three things clear: females participate in DE at higher rates than males; socioeconomic status is a strong predictor of DE participation; and that DE may predominantly be for high achieving students. As investment in DE programs continues to grow under the guise of human capital development, policymakers should engage in cost-benefit analyses, contemplate the opportunity costs involved, and ensure that opportunities are not being hoarded by already advantaged students.

Luis E. Rivera, M.S., received his Master of Science Degree in Economics from the University of Texas at El Paso. He is currently working in the private sector, but has an ongoing interest in educational topics related to human capital development and dual enrollment.

Stephen Kotok, Ph.D., is an Assistant Professor of Administrative and Instructional Leadership at St. John's University. His research focuses on the opportunity gap for low-income and minority students and how school context affects disparities. Specific areas of research include school choice, segregation, tracking, and school climate.

Nathan Ashby, Ph.D., is an Associate Professor of Economics at The University of Texas at El Paso. His published research focuses on the determinants of migration, the disparate impact of crime on foreign investment in Mexico, and the impact of economic and political institutions on human wellbeing.

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Published online: July 2019

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ALEX J. ARMONDA

The University of Texas at Austin

To cite this article: Armonda, A.J. (2019). Advancing an (im)possible alternative: Ethnic studies in neoliberal times. *Texas Education Review*, 7(2), 30-44. <http://dx.doi.org/10.26153/tsw/2283>

Advancing an (Im)possible Alternative: Ethnic Studies in Neoliberal Times

ALEX J. ARMONDA
The University of Texas at Austin

The establishment of what is now known as Ethnic Studies at San Francisco State University in the late 1960's represented a decisive victory for grassroots movements led by young scholars and students, who drew their political and theoretical inspiration from the anti-hegemonic and anti-colonial upheavals that animated the revolutionary spirit of the era (Tintiango-Cubales et al., 2014). The Ethnic Studies movement constituted a broad effort to challenge the constricted disciplinary perspectives that have historically defined the Western academy. The appearance of a multitude of subaltern standpoints from which new knowledges, histories, and political futurities were being generated threw into question the boundaries and procedures that had worked to contain, discipline, and legitimize the Western sciences. While Ethnic Studies has since then been used as an umbrella term to cover a number of specific areas of inquiry (e.g. Black studies, Chicana studies, American Indian studies, Asian American studies), Sleeter (2011) has nevertheless identified within the contemporary Ethnic Studies five common themes or tenets, which I summarize as follows: 1. The critical consideration of the positionality of the subject from which knowledge is constructed or leveraged; 2. The close examination of the dynamics of U.S. colonialism and neocolonial formations; 3. A critical attendance to the ideological and historical constructions of race, including the institutionalization of race and the struggles of people of color for liberation; 4. An investigation of the meaning and function of collective and of communal identity and; 5. The study of one's communal artifacts, whether artistic or intellectual, whether historic or contemporary. Taking these tenets as a point of departure, this conceptual paper aims to extend and clarify the radical political potential of Ethnic Studies in the context of neoliberal capitalism, and the crucial role that Ethnic Studies can play in realizing critical pedagogy's promise of emancipatory social transformation in the present.

As noted, we must frame the push for Ethnic Studies as but one important expression of a broader effort to challenge the coloniality of the academy and academic knowledge as such. This is a project that aims to disrupt the ontologies, epistemologies, and dominant ideologies that are positioned in schools as neutral, objective, ahistorical, or atheoretical (see Apple, 2004), doing so by way of what Paulo Freire (1970, 1993) called praxis, a term which designates both critical reflection and strategic intervention into our material conditions of existence. In this way, Ethnic Studies has been strongly linked to transformative forms of community engagement (Lopez & Romero, 2017), which draw specifically upon the variety of cultural wealth and social capital of historically marginalized communities (Yosso, 2005). The central question addressed here, however, concerns the specific ways in which these alternative forms of social investment have to be made sense of in the global context of neoliberal capitalism, which has been described as a properly biopolitical regime that consistently finds new ways of incorporating and neutralizing the immaterial productions of marginalized communities and subjectivities (see Hardt & Negri, 2004).

In direct challenge to the recuperative tendencies of neoliberal capital, this essay aims to raise the question of Ethnic Studies as a crucial site of generative conflict, of theoretical irreconciliation – a site of a productive disruption, of a potential rejection of the neoliberal order of things and the opening of new social and political horizons. I see this following two distinct yet interrelated paths of exploration, through what I call its 'external' and 'internal' valences of contestation and negotiation. In the first section of this review, I will trace the contentious relationship between the Ethnic Studies movement and the challenges advanced by neoliberal multicultural ideology and the agents of neoliberal educational reform, which will culminate in an extended discussion of the passage of

Arizona House Bill 2281. I then offer a brief meditation on some of the contemporary efforts to legitimize Ethnic Studies in the wake of the bill's passage, asking whether or not it is possible to square the transformative objectives of Ethnic Studies with the instrumentalized models of assessment and measurement that characterize the neoliberal agenda for reform in public education.

However, I want to make it clear in advance that by situating Ethnic Studies in relation to the neoliberal problematic, I do not mean to say that all of the forces working against Ethnic Studies programs are strictly neoliberal ones; this analytic is useful, but it is neither comprehensive, nor is it final. And insofar as readers may know of the ultimate fate of HB 2281 (which a federal judge ruled unconstitutional in 2017), I believe it would be naïve to consider this analysis as a kind of post mortem. If anything, the recent actions taken by the Trump administration have done well to remind us that the juridical sphere hardly constitutes a neutral space wherein which justice is secured or delivered. The logics of exclusion seen at work in HB 2281 are still very much with us today. We need only look as far as the recent 'Muslim Ban,' the declaration of a state of emergency at the U.S. – Mexico border, the systematic denial of due process for refugees, the unconscionable separation of families, and the renewed ethos of militaristic intervention to see the extent to which the identification and violation of the Other remains essential for consolidating and sustaining dominant fantasies of 'security' and 'protection.'

In the second section of this paper, I argue for a dialectical description of Ethnic Studies, emphasizing its ability to stage productive confrontations between traditions in Marxist philosophy, decolonial theory, and critical race theory – the tensions of which are key to reframing our understanding of consciousness raising and the formation of radical subjectivities in the present. The central question that emerges throughout the course of this review concerns the status and enduring vitality of the political imaginary, of our ability to engage in the envisioning of radical alternatives despite the atrophy such capacities have suffered under the neoliberal regime. I have aimed to distill the theoretical contours that have characterized some of the major inquiries into the topic, while attempting to maintain the contradictions that underscore them – the very antagonisms that may yet initiate key points of departure for the generation of novel kinds of emancipatory praxis moving forward.

External Contestations: Ethnic Studies and Neoliberal Reform

The Birth of Neoliberal Multiculturalism

In order to understand the fundamental changes that neoliberalism – here understood as both a resurgent laissez-faire economic doctrine as well as a social philosophy rooted in Western principles of individualism – would inaugurate within the sphere of multicultural discourse, we have to first grasp the political situation in which it realized its initial intervention. To that end, Kymlicka's (2013) discussion on the multicultural policies of the 1960's contextualizes the birth of the Ethnic Studies movement within the larger political dynamics of 'citizenation' that were then being negotiated between state actors and grassroots organizers and activists. And, of course, while the decade marked a number of watershed moments for the legitimation of ethnic identity politics within and across the democracies of the West, we must also recognize the degree to which such state-sanctioned 'politics of multiculturalism' nevertheless served to curb the more genuinely revolutionary impulses inherent to the various movements in question. In other words, these official discourses of multiculturalism, and the political victories so often attributed to them, were indeed always-already symptomatic of a convergence of dominant and oppositional interests, as Bell (1980) masterfully elucidated in his seminal reading of the Civil Rights Act of 1964.

Yet, while Western states secured for themselves throughout this time a tenuous equilibrium between the politics of nationalism and citizenship on the one hand and the politics of identity and social liberalism on the other, the rise of neoliberalism in the 1980's initially met this multicultural reality with deep hostility. As Kymlicka (2013) noted,

Indeed, the first wave of neoliberals in the United States, United Kingdom, Canada, and Australia were uniformly critical of multiculturalism, which they viewed as a prime example of unjustified intervention in the market in response to "special interests" caused by the capture of state power by ethnic entrepreneurs and their rent-seeking allies in the bureaucracy. (p. 107)

We thus identify the parameters of the ideological space that would provide the foundations necessary for a series of strategic interventions aimed at delegitimizing the Ethnic Studies movement. This appears to develop along a three-pronged axis of attack. The first is grounded in neoliberalism's anti-Keynesian impulse, for which government-sanctioned initiatives aimed at redressing systemic inequities appear precisely as the kind of interventional policy deemed by neoliberal proponents to be anathema to their market-driven, supply-side solutions (Harvey, 2005). The second deals with the correlative shifts that neoliberalism inaugurates at the locus of the individual subject, whose essential rearticulation as a 'market actor' frees it from the fetters of social solidarity, providing a space wherein which a disciplinary ethic of self-conduct can blossom in accordance with the actuarial language of investments and returns which, at the same time, moralizes the consequences of individual (rather than collective) choice (Besley and Peters, 2007; Brown, 2003; Foucault, 2008).

The third and perhaps most problematic dimension deals with the way in which neoliberalism eventually came to appropriate for itself the productive energies of the multicultural movements that preceded it. This is what Kymlicka (2013) has called neoliberal multiculturalism, which describes the process by which neoliberal actors came to see 'the field of ethnic relations' as an asset to be leveraged in the construction of an increasingly deterritorialized global marketplace, the viability of which necessitated the incorporation of ethnic identities, markers, and artifacts as an antecedent upon which the valorization and accumulation of new capital could be generated (pp. 109-110). As Mitchell (2003) argued, the older political brand of state-sanctioned multiculturalism – while being from its very inception linked to the hegemonic maintenance of capital as an ideology – still provided opportunities for even the most ephemeral moments of harmonious alignment between groups with divergent class-based or ethnically-based interests. Yet, within the neoliberal moment,

This particular form of multiculturalism is thus increasingly perceived by contemporary neoliberal politicians as either irrelevant or negative as a political philosophy, and is now being undermined in educational systems... [where] it is rapidly being replaced with a meaner, harder logic of competition on a global scale, and of a strategic, outward-looking cosmopolitanism. (p. 392)

In other words, neoliberal ideology, particularly as it is expressed through education and schooling, issues a cosmopolitan imperative: we are disciplined to become cosmopolitan actors, nodal points through which networks of material and immaterial exchange are to proliferate and multiply in the space of the global economy. Undercutting, at the level of subjectivity itself, the deeply anti-capitalist tendencies of the Ethnic Studies movement, multiculturalism is here reduced to another strategic reflex in the composition of the entrepreneurial self. The moment where the signifiers for 'cultural competency' appear as a bullet point on the corporate resume suggests, at the same time, the extirpation of any remaining currency 'multiculturalism' may have held for those concerned with political contestation and collective struggle.

But this is in no way to suggest that neoliberalism's mobilization of the multicultural impulse is accompanied by a veritable waning of institutional forms of racialized prejudice and violence. Indeed, Melamed's (2006) examination points us toward the opposite conclusion: that despite the in-

sistence on the part of neoliberal actors to detach race and the legacies of state-sponsored racial discrimination from the discourses of cultural politics, the ideological mystifications that constitute neoliberal multiculturalism and the ‘post-racial’ imaginary not only allow for the exploitation of communities of color to continue unabated, they further provide neoliberal actors with the symbolic purchase necessary for their profit-driven interventions in the social field to be heralded as benevolently humanitarian and philanthropic (Buras, 2011; Lipman, 2015). In shifting the conversation back to the recent controversies surrounding the high school Ethnic Studies program in Tucson, Arizona, what we must throw into relief, above all else, is neoliberalism’s recourse to the pernicious ideology of racial colorblindness.

Arizona HB 2281 and the Neoliberal Racial Imaginary

The discursive shifts outlined above are critical to understanding the ideological dynamics that drove the passage of Arizona House Bill 2281 (HB 2281) in 2010, which has been described as a legislative effort engineered to target and effectively eliminate the thriving Mexican American Studies (MAS) program housed within the Tucson Unified School District (TUSD). The controversy surrounding the bill’s passage – as well as the now famous display of public resistance by TUSD students – made rounds on a variety of local and national media outlets. At the time, Sleeter (2011) designated TUSD’s MAS program as the only “fully fledged” high school Ethnic Studies program in existence within the United States. Romero (2010) has gone even further in detailing how the program began as a grassroots initiative for the improvement of educational outcomes for Chicax students in TUSD in the late 1990’s, and how its roots extend back to a series of walkouts led by student activists in the late 1960’s, whose demands included the establishment of a Chicano Studies program as part of a more comprehensive effort to begin redressing the devastatingly inequitable effects of TUSD’s school funding policies. In this way, the struggle to build TUSD’s MAS program cannot be separated from the local legacies of Chicax activists and their relentless pursuit of educational justice.

While the MAS program survived a variety of legal attacks by the state in years prior, the successful passage of HB 2281 meant that classes in Arizona public schools were subsequently forbidden to:

- 1.) Promote the overthrow of the US government.
 - 2.) Promote resentment toward a race or class of people.
 - 3.) Be designed primarily for pupils of a particular ethnic group.
 - 4.) Advocate ethnic solidarity instead of the treatment of pupils as individuals
- (Arizona Revised Statutes, p. 1, lines 12-16)

Critical responses to the bill have characterized it as ‘neoliberalism by law’ (Serna, 2013), and it is precisely this line of critique we are pressed to trace here. To begin, we must contextualize the language of HB 2281 in relation to neoliberal multiculturalism and the logic of its colorblind ideology, which refers to the contemporary structuring of a racism ‘without race,’ a discourse of race that has, in the post-Civil Rights era, become ‘naturalized’ through the abstract language of laissez-faire liberalism (Bonilla-Silva, 2015). As Gillborn (2014) noted, the erroneous, yet entirely necessary, notion assumed by its legislative architects – one that is perhaps best captured in the second clause of the bill – mistakes the program’s emphasis on the deconstruction of institutionalized whiteness and white supremacy as an attack on “white people” (p. 32). Under these pretenses, the bill inscribes into law a vision of colorblindness which secures the very worldview that neoliberalism informally imposes elsewhere (see Melamed, 2006) – not only in its drive to separate the cultural from the racial, but in its explicit degradation of the politics of ethnic solidarity via the fetishization of the ‘pupil as individual.’ The nominal claim to post-racial harmony thus renders any explicit invocation of institu-

tionalized racism (or perhaps even race itself) – not even to mention collective struggle – seditious, and, in a way, anachronistic. Tom Horne, serving as Arizona’s Superintendent of Public Instruction at the time of the bill’s passage, claimed that he – presumably along with the other architects of HB 2281 – was following in the most progressively humanistic way the lesson of Martin Luther King when he reiterated his faith in the principle that “we are individuals... not exemplars of the race we’re born into” (Horne, quoted in Moore, 2010).

Dotts (2015), recognizing Arizona’s particular historical legacy of cultural and curricular imperialism, has argued that what HB 2281’s proponents fail to recognize is the way in which their own white privilege functions in relation to their investment in the mythos of a democratic, pluralistic, and meritocratic America. Whereas this may certainly be the case, such arguments may do well to ascribe to subjective ignorance or error the objective logic of violation coordinated within the symbolic space of neoliberalism itself (see Žižek, 2008a). In other words, the bill represents the moral failure of individuals inasmuch as it does an achievement – the crystallization in juridical terms of a more nebulous ideological agenda running more or less according to plan. In this way, Clark and Reed (2010) have described how

HB 2281 is predicated on neoliberal colorblind racial ideology. That ideological orientation is rooted in logic that undermines the work of Racialized Communities Studies by denying colonization and racial oppression, white privilege, and, importantly, the past and present of racialized communities’ grassroots efforts to name and hold accountable the agents and institutions of settler colonization, racial oppression, and white supremacy. (p. 44)

Following this, we will maintain that HB 2281 represented but a variation of the colonialist discourse inscribed into the very heart of the U.S. national project itself, which has historically worked to secure and legitimize material accumulation on the exploitation and exclusion of Indigenous, African-American, and Latinx communities (Kunnie, 2010). But to understand the dynamics of exclusion as they play out here requires us to recognize the particular antagonisms inherent to the neoliberal racial imaginary and its tendency toward the symbolic and material reterritorialization of space. Thus, while HB 2281 represents a logic of exclusion which proceeds along epistemological lines – the exclusion of the knowledge of the Other – we may locate its corollary in Arizona’s controversial Senate Bill 1070, whose granting of broad power to law enforcement included an ability to ‘determine’ immigration status during routine traffic stops, as representing the sovereign’s pursuit to violate the body of the Other (Martinez, 2012). Bolstering this idea is the fact that previous legislative attempts to dismantle TUSD’s MAS program came packaged in a number of proposed homeland security bills, suggesting that the very possibility of a transformative educational experience for children of color is not only reducible to an attack on “white people” as such, but reveals the extent to which whiteness itself becomes coextensive with the sovereignty and safety of the state in the dominant racial imaginary (Romero and Arce, 2009).

Yet, if we are to consider the logic of these juridical interventions in relation to the ‘post-racial’ procedures of neoliberalism and neoliberal ideology, a series of contradictions appear that may indeed hold serious theoretical value. Here, Wanberg’s (2013) perspicacious analysis has established one important point of departure: that HB 2281 lays bare the way in which race in the neoliberal imaginary must simultaneously appear as excessive, as a threat which serves as the grounds for a legitimate reactionary response, and nonexistent, as that which must continually reaffirm its claim to colorblindness as a means “to destabilize the very intelligibility of racism” itself (p. 31). In other words, it paradoxically requires the very thing it rejects, clueing us in to the fetishistic logic of disavowal that, in turn, constitutes the parameters of its ideological space (Žižek, 2008b).

This dialectic is reiterated in a slightly different way by Cacho (2010), who has argued that the affective and symbolic circulation of fear in the debate around HB 2281 works precisely because it lacks a fixed, stable referent; that this discursive economy, characterized by a constant vacillation

between presence and absence, illustrates the way in which dominant anxieties gain strength as they shift rather effortlessly between the locus of the racial Other, the Marxist revolutionary, the undocumented migrant, and so forth. Furthermore, one of the chief conservative criticisms of TUSD's MAS program is that it advocates 'feeling over fact' (Cacho, p. 30). This gesture sees affect as symbolically sutured to the advancement of subversive political agendas, which are then situated over and against the neutral, objective, affectless operations that characterize 'real' learning; in Cacho's words, "indifference (as an emotional response unrecognized as such) becomes the sole criterion for fact" (p. 30). In this way, the mobilization and investment of affect, much akin to the mobilization of racial significations, must again function in a manner that is, paradoxically, both nonexistent and excessive. I will add that such investigations represent merely the first step in our task of mapping the deep contours of neoliberalism's racialized imaginary, by way of striking at the heart of the constitutive disavowals which inform and sustain its ideological and symbolic economies.

The Problem of Success

At the very least, such dialectical lines of pursuit strike one as essential to the praxis of Ethnic Studies in particular, which, in the wake of HB 2281, has found itself caught in a double-bind in relation to the question of its legitimacy as a veritable branch of academic study. In light of the attacks from those on the political right, some scholars and advocates of TUSD's MAS program have maintained that it is possible to square the objectives of Ethnic Studies with both the Common Core standards as well as the more traditional metrics of measuring student achievement (Cammarota & Romero, 2009; De los Rios, Lopez, & Morrel, 2015; Romero, 2010). However, scholars such as Cacho (2010) have argued that these efforts to establish legitimacy would set the terms for a 'victory in defeat' (p. 34), signaling, as it were, a more basic submission to the institutional mechanisms that constitute a major part of the Ethnic Studies' object of critique.

The idea of using quantitative procedures to measure of the outcomes of students participating in Ethnic Studies courses is by no means new. Studies as far back as the early 1970s have sought 'experimental' answers to questions related to the shifts that enrollment in such classes may have in relation to participants' attitudes on a variety of factors – from opinions on ethnic minority groups to the favorability of their orientation toward school itself (Funkland, Peterson, & Trent, 1973). Interestingly, this early study notes that the Ethnic Studies program under consideration was developed with the intention of 'improving race relations' between students, and one of the authors' key findings was that the course was indeed "successful in attaining its major objective of improving student attitude toward school" (p. 167). The focal point of this quantitative inquiry – offered during the nascent years of the Ethnic Studies movement, no less – makes perhaps even more sense when considering Kymlicka's (2013) analysis of the dynamics of liberal-multiculturalism prior to the Reagan era and the rise of neoliberal educational policy.

Today, scholars arguing in favor of Ethnic Studies similarly point to the positive effects it has on participants' educational outcomes. For example, Cabrera et al. (2014) suggested that the politicization of Tucson's MAS program has obfuscated the statistics that demonstrate student success. In pointing first toward the fact that even the more comprehensive literature reviews on the topic of Ethnic Studies (particularly Sleeter, 2011) draw mostly from qualitative analyses with small sample sizes, they have sought to redress these gaps by providing a quantitative analysis examining student achievement of those participating in TUSD's MAS program. Indeed, the results of their study showed that MAS students saw a positive difference in their likelihood to graduate high school, as well as a significant increase in the likelihood of passing the Arizona Instrument to Measure Standards (AIMS) test for students that failed it on their first attempt. Furthermore, MAS students with low 9th and 10th grade GPAs later outperformed their peers on the AIMS test, defying the prevail-

ing trends in quantitative research that correlates higher GPA in 9th and 10th grades with higher achievement on standardized exams taken in students' junior or senior years.

Many among us will find these results striking. On the one hand, MAS proponents should perhaps feel justified in invoking the statistical jargon that is so often leveraged in the decision making processes of neoliberal policy-makers and relevant third-party players, including non-profit organizations like Teach for America and private industry giants such as Pearson – the very same decision making processes that have in turn rendered content areas outside of the core of reading, science, and mathematics increasingly subject to elimination (see Au, 2017). While statistically supported outcomes may bolster the validity of Ethnic Studies programs in the eyes of post-NCLB state actors more averse to the 'ideologically laden' procedures of qualitative inquiry (St. Pierre, 2011), they may nevertheless signal a more fundamental acquiescence to the objectifying technologies and tendencies of neoliberalism's agenda for educational reform, whose very "will to truth" (Foucault, 2010) constitutes the essential terrain upon which Ethnic Studies' advocates seek to stage their critical and anti-colonial interventions. A decisive answer to this dilemma is, of course, unlikely – but that does not necessarily imply that it cannot be productive. Indeed, future analyses should explore the degree to which this double-bind can open our thinking to new valences of the neoliberal-multicultural problematic, and help to lay bare the hidden traps, ideological complicities, and political implications that appear by consequence of our desire to leverage the discourse of the dominant educational regime against itself.

Ethnic Studies and the Pedagogical Dialectics of Revolutionary Futurity

A Space for Critical (Ir)reconciliation

This section will bring to light relevant theoretical and qualitative literature that deals specifically with the question of the pedagogical character of Ethnic Studies, broadly considered. As I suggested at the outset of this review, Ethnic Studies scholars and advocates have been nearly unanimous in acknowledging the profound influence of Brazilian educator and critical theorist Paulo Freire (1970, 1993). Among his many contributions to the field, we frequently find cited the notion of praxis (Camarota, 2016; Halagao, 2010; Tintiangco-Cubales, et al., 2014); an emphasis on student agency, participation, and self-determination (Akom, Camarota, & Ginwright, 2008); and the development of critical consciousness through student engagement in genuine moments of dialogue (Jocson, 2008; Marrun, 2018).

Given that Ethnic Studies locates its theoretical foundation in the tradition of critical pedagogy, we are first pressed to identify the ways in which this project engages and extends the rich legacy of dialectical thought. Beginning with its deployments in the political writings of Karl Marx, the purpose of dialectical thinking was to demystify the ideological configurations that obfuscate and justify the exploitation and alienation of those exposed to the violence of capital. Thus, the point of departure for dialectical analysis, inherited by Freire in his explication of critical pedagogy, becomes the moment of our encounter with the constitutive antagonisms that exist within a given socio-economic or symbolic formation (Darder, 2016; McLaren, 2015). The phenomenological effect of dialectical analysis is precisely what Freire (1970, 1993) called conscientization – the apprehension, on the part of the oppressed, of a reality that is capable of being transformed through reflective action (p. 85) – a concept which Ethnic Studies as well as various asset-based pedagogies have adopted in their explicit endorsement of the politically oriented consciousness raising of historically marginalized student groups.

At the same time, we would be remiss in failing to register how critical pedagogy has itself come under scrutiny for a variety of reasons over the years. Critical race theorists in particular have

indicted critical pedagogy (and Marxism generally) for privileging the analytic of class over that of race (Leonardo, 2009; Mills, 1998). We would also do well to consider the poststructural criticism of critical pedagogy's overreliance on rationality, which feminist scholars in particular identified as overly masculine and therefore politically and epistemologically limited (Ellsworth, 1989; Lather, 1998). This being said, my purpose at this time is not so much to sketch a prospectus of reconciliation as much as it is to point out how the theorization of praxis in the field of Ethnic Studies may be already gesturing toward a productive engagement with these tensions described as such. De los Rios, Lopez, and Morrel (2015) suggested as much when they acknowledged that, while critical pedagogy offers us much in the way of mobilizing collective action, it nevertheless "lacks an explicit attention to race and racial relations that is at the heart of Ethnic Studies" (p. 86). Therefore, in recentering an analytic of race grounded in the traditions of African-American intellectual thought (e.g. Woodson, 1990; Du Bois, 1903), as well as historical perspectives in decolonial theory (e.g. Fanon, 2005), the heterodox critical pedagogy of Ethnic Studies better positions itself as a means of intervention within the neocolonial procedures endemic to neoliberalism and neoliberal educational reform – an intervention which the analytic of class alone would fail to provide.

Cammarota (2016) made a similar gesture in this reconciliatory spirit when he described how the Social Justice Educational Project of Tucson (of which the aforementioned MAS program is one part) leverages the Du Boisian notion of second sight as a key element in the critical transformation of student consciousness. Here, second sight refers to the particular subjective position that provides people of color with a unique vantage point to examine the contradictions and oppressions inherent to so-called 'democratic' and 'egalitarian' society – a concept Cammarota has extended in his analysis of Ethnic Studies by accounting for the dimension of youth as an important axis of social marginality (p. 234). Much like the working class subject of Marxism that understands, by the very nature of its position within the schema of production, the inner truth of capital through its repeated exposure to its essential moment of violence (Lukács, 1967; De Lissovoy, 2010), the concept of second sight describes the perspectival dynamic necessary for students to encounter the truth of their position within the structure of white supremacy itself. The school is thus recast as the primary site wherein students are to confront a dominant racialized logic that both coordinates and legitimizes asymmetrical distributions of corporeal, symbolic, and affective violation.

Some scholars are even more explicit in connecting the epistemologically disruptive commitments of Ethnic Studies to the legacy of dialectical thought, grounded as they both are in their necessarily confrontational relationship to non-dialectical, common-sense, or ideologically reified forms of understanding (Jameson, 2009). As Serna (2013) noted, it is imperative that Ethnic Studies borrow liberally from both Indigenous and Western foundation in generating new and creative forms of resistance in the face of neoliberalism's regime of terror and generalized precarity (De Lissovoy, 2017). Here, Serna (2013) has described the example of the Xicano Paradigm (p. 49) developed within Tucson's MAS program. As the product of a collaborative effort between MAS teachers and Chicano elders, its methodology draws upon pre-Columbian knowledges, critical race theory, and Freirean pedagogy, with the purpose of outlining four stages that students must move through in order to realize an academic identity grounded in transformative agency and communal solidarity.

What comes into view is a vision of Ethnic Studies as a radical space of epistemological and ontological ambiguity, disjunction, and potential (but entirely provisional) moments of clarity and synthesis. This is, perhaps, why some have found value in the terms *sitio* and *lengua* (Marrun, 2018) to describe the transformational dynamic at stake in the Ethnic Studies project. *Sitio* refers to the site itself, the space of negotiation where students are encouraged to identify and negotiate dialectically the contradictions that develop between their lived experience 'at home' and the way in which they are positioned within white academic institutions of learning, while *lengua* describes the hybrid-

ized medium of discourse from which the subversion of the dominant must proceed – what Freire would call the naming of the world. Yet, in a way that is responsive to the criticisms of critical pedagogy as being over-reliant on a Eurocentric rationality, what emerges here is a kind of rigorous educational experience that embraces the productive dimensions of affect – including those of humor (Chapman and Olguin, 2016) and spirituality – whose very revivification and rearticulation signal new modes of resistance to the deterritorializing mechanics of settler colonialism, to capital’s unquenchable thirst for material and symbolic accumulation (Simpson, 2014).

In considering all of this, we move toward a dialectical understanding of Ethnic Studies in its own right – as a space, language, and pedagogical orientation that draws tenor and force from the very institutional, structural, and theoretical antagonisms that, in fact, prevent it from achieving its own ‘sanctioned’ form. Considered as such, Ethnic Studies does indeed present us with the promise of a reconciliation or synthesis, but it is one that must never arrive, one that must continue to fall short of its goal of integrating or resolving the multitude of perspectives and impulses that animate it. This, we could say, is essential to sustaining the generative space of conflict necessary for imagining emancipatory possibilities beyond the ideological horizon of the present.

Toward a Decolonial Imaginary

The engagement of *sitio* and *lengua*, together with the challenge that the question of hybridity and liminality (Anzaldúa, 2012) bring to Western modes of understanding predicated on taxonomy, boundary, and disjunction, becomes the essential moment in the theorization of a decolonial imaginary (De los Rios, 2013). A lucid example of this is the Transformative Pedagogy Project developed at University of California Santa Barbara, which aims to connect the very act of knowing to the disruption of the ontological and epistemological forms of violence that prevail within and among colonial institutions (Fujino et al., 2018). The task for the students and educators in such programs is not, of course, to eliminate the colonizer as a material embodiment (the empirical designation of a class of people), but to intervene directly upon the bodies of knowledge that provide for them the hierarchical and value-laden schemas that allow for differentiated ‘human kinds’ to emerge as both intelligible and natural in the first instance (Brown, 2013). It must be reiterated that the *sitio* is not a ‘safe space,’ but a site of deep epistemological contestation – where the centering of marginalized voices and experiences serves as the crucial first step in the larger project of collective struggle and transformation, to devise through praxis what the authors have called “a theoretical description of decolonial practice in the face of an unlivable collective destiny” (Fujino et al., 2018, p. 71).

In following the path traced by these scholars and theorists, the standard descriptions of Ethnic Studies as simply a site of cultural reclamation (or, for those on the political right, of cultural separatism) seem to miss the mark. More specifically, when considering these contemporary projects of cultural reclamation, we must pay keen attention to the ways in which multiplicitous knowledges are continually negotiated to figure new and oppositional political significations. Just as Fujino et al. (2018) pointed out how Moses can become a signifier of resistance for enslaved African-Americans in the Antebellum South, or the Virgen de Guadalupe a symbolic proxy for colonized peoples of Mexico to connect with an effaced religious history (pp. 75-76), so too have the writings of Hegel and Marx served as points of departure for decolonial theorist Aime Césaire’s (1972, 2000) dialectical reading of Western civilization as history’s true bastion of barbarity and despotism. Such instances of symbolic appropriation and inversion contain the kernel of potentiality for new and positive deployments in the field of knowledge, signaling the outlines of hitherto unperceivable epistemological, ontological, and axiological parameters of political praxis that, in turn, animate unorthodox exercises of the social imaginary.

In this way, the decolonial imaginary is indicative of a kind of retroactivity that, counter to any notion of a ‘pure return’ to a pre-capitalist past, poses to us the question of a revolutionary futurity; looking forward, it asks us to ponder the commitments and fate of the multitude, the human collective understood as a set of irreducible singularities that produce and struggle in common (Hardt & Negri, 2004). As culturally endemic ways of knowing and being are resecured, reestablished, and reclaimed within whitestream spaces (the school, the archive, the state, and so on), they undergo novel forms of elaboration as they are articulated over and against the discursive, ideological, and material logics of violation that characterize institutional bodies of practice. Here, Paris and Alim (2014) have invoked as much in their criticism of asset pedagogies that focus solely on the ways in which cultural differences have been enacted, rather than attending to how they are and will be enacted in a situation of cultural recombination and flow that has, in our postmodern moment, radically altered the relationship between the individual, the communal, the national, and the global, as well as the consistency and integrity of these spatialized hierarchies in and of themselves.

And yet it must be stated with force that the kind of decolonial imaginary in question can neither be reduced to misguided notions of postmodern relativism, nor to the liberal brand of ‘cultural pluralism’ so often observed within the field of Social Studies education, which does well to restrict, rather than enable, possibilities for the envisioning of political alternatives (Magill, 2017). What it means to offer, I think, is much closer to what Chandra Mohanty (2003) has called a decolonizing pedagogy – one which commits us to examining difference as historical, relationally articulated, and contingent, while at the same time deeply embedded within and reified through asymmetrical relations of power; a pedagogy which pushes us to recognize how “the contradictions and incommensurability of social interests” (p. 204) creates, in turn, the conditions necessary for nurturing the kinds of oppositional consciousness necessary for more fundamental and enduring kinds of social transformation.

To properly embrace the role that Ethnic Studies might play in the effort to build a *sitio* and *lengua* of a revolutionary futurity may require us to first shed our skepticism of utopianism and utopian thinking. Akom, Cammarota, and Ginwright (2008) have already taken a crucial step by linking the methodologies, pedagogies, and theories of social-justice based action characteristic of Ethnic Studies programs to the notion of Youthtopia, which, they argue, inaugurates fundamentally new ways of understanding the investment and distribution of social and intellectual capital by marginalized youth within imagined communities and third spaces. As sites of praxis, Youthtopias describe immanent fields of social production where heterodox expressions of collective subjectivity and agency take shape (see Hardt & Negri, 2000). I would argue that we are witnessing many examples of this very youth-driven impulse today: in the unflinching activism of the Parkland shooting survivors against America’s deeply corrupt gun lobby, in the recent grassroots driven victory of New York social activist Alexandria Ocasio-Cortez, and in the students behind the case of *Juliana v. U.S.*, who are suing the federal government for its failure to prevent the ecological catastrophes engendered by global climate change.

And so, in direct opposition to the criticisms proffered by lawmakers and pundits accusing Ethnic Studies programs of promulgating seditious identitarian politics (Clark & Reed, 2010; Wanberg, 2013), what we see reflected across this body of literature is a tendential movement toward a much different goal: a formal rupture and sublation of limited conceptualizations of identity, knowledge, and being – and, consequently, a rejection of the narrow political projects that would follow from them. The aim of Ethnic Studies is, rather, to incessantly throw into question the self-contained groundedness of the personal or localized experience, and to move students toward an ontological perspective “wrapped in a garment of mutuality with a wider world” (Fujino et al., p. 76). This means that, for students, the classroom should open a dialogue that connects the tensions that define the immediacy of their subjective experience, the global scenes of political crisis that register

neoliberalism's impoverished vision of a social existence in common, and the obscene undersides of exclusion, exploitation, and renewed colonial conquest that work to secure the reproduction of this reality in turn (see De Lissovoy, 2018).

Conclusion

Those in the critical pedagogical tradition have maintained that is impossible to separate the question of education from the economic and ideological expressions of power and the commensurate expressions of resistance that characterize a given historical intersection. The crises of neoliberal capitalism – the most alarming index of which is the increasing likelihood of global ecological catastrophe – urgently demand from us an ability to bring to bear a properly ecumenical perspective upon even the most localized experience (De Lissovoy, 2010). We would therefore not be misguided in stating that this monumental task requires an altogether different mode of conceptualizing the nature of our relationality as subjects, and to consider deeply the kinds of ethical commitments such rearticulations would imply. What is at stake is the character of what Freire would call our historical vocation – one that must be guided by a commitment to a revolutionary futurity as conceived within and through dialectical thought, a kind of utopian desire invested in a decolonial imaginary that extends well beyond what neoliberalism has attempted to secure before us as its horizon of the given. And where this exercise may have reminded us that Ethnic Studies classrooms are in so many ways limited in their capacity to provide space for students to realize radical alternatives for political life, they may yet remain the best place to begin that difficult project.

Alex J. Armonda, M.A., is a Ph.D. student in the Cultural Studies in Education program at the University of Texas at Austin. A former 8th grade language arts teacher from Chicago, Illinois, Alex currently teaches an undergraduate course on the social foundations of education, and serves as a field supervisor for preservice teachers in the elementary teaching program. He received his Master's in Teaching from Dominican University in 2017 and his B.A. in English from the University of Iowa in 2013. His research aims at extending the critical analysis of neoliberal reform in education, exploring it in relation to the broader questions of capital, biopolitics, and coloniality, while describing the deeper challenges that neoliberal ideology poses to established traditions in critical pedagogical thought. Alex recently presented his work on the dialectics of Paulo Freire at the 2018 American Educational Studies Association conference.

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ANNE DALY-LESCH

The University of Texas at Austin

To cite this article: Daly-Lesch, A. (2019). Using literacy to enact critical pedagogy and scientific inquiry: An analytic literature review. *Texas Education Review*, 7(2), 45-59.

<http://dx.doi.org/10.26153/tsw/2284>

Using Literacy to Enact Critical Pedagogy and Scientific Inquiry: An Analytic Literature Review

ANNE DALY-LESCH
The University of Texas at Austin

Students who enter K-12 classrooms are active meaning-makers and inquirers and come to school eager to explore their physical, social, and cultural worlds. Literacy is a powerful tool that can be used across content areas to generate new understandings, develop skills, and interrogate curricular knowledge (Janks, 2010; Moje, 2015; Smith, 1934). This is especially true within the domain of science education where students are engaged in reading texts, designing investigations, and crafting scientific arguments (Cervetti, Jaynes, & Hiebert, 2009; Cervetti, Pearson, Barber, Hiebert, & Bernardo, 2007; Schwarz, Passmore, & Reiser, 2017).

Unfortunately, opportunities to integrate reading and writing into the study of science are rare (Gavelek, Raphael, Biondo, & Wang, 2000). In the era of accountability reform, students spend more time acquiring the technical aspects of reading and writing skills instead of using them to generate new understandings within science (Cervetti et al., 2009). Moreover, students from linguistically, racially, and economically diverse backgrounds experience far fewer opportunities to engage in science-literacy learning due to test-centric curricula and high-stakes testing demands (Davis & Willson, 2015; Nichols & Berliner, 2008; Wright & Gotwals, 2017). Literacy learning that prioritizes the acquisition of skills over using literacy to develop new understandings perpetuates oppressive schooling conditions that contradict the ways people jointly use literacy and science to make sense of the world around them (Hoffman, 2017; Moje et al., 2004; Schwarz et al., 2017).

One way educators have disrupted single-subject learning to integrate literacy with science is through inquiry-based teaching methods. Defined broadly, inquiry is a pedagogical approach that centers all learning experiences around students' curiosities and interests (Maloch & Horsey, 2013; Owens, Hester, & Teale, 2002; Wells, 1999). Within an inquiry-based science curriculum, reading and writing become essential tools to engage in the specific practices of inquiry, such as designing investigations, evaluating multiple sources of information, and developing evidence-based arguments (Schwarz et al., 2016). Pearson, Moje, and Greenleaf (2010) noted the mutual benefits of an integrated science-literacy inquiry approach, explaining that "When literacy activities are driven by inquiry, students simultaneously learn how to read and write science texts and to do science" (p. 459-460). Previous research has examined the effects of an inquiry-based approach in teaching science and literacy, noting the positive impact it has on students' academic learning (Cervetti, Barber, Dorph, Pearson, & Goldschmidt, 2012; Ødegaard, Haug, Mork, & Sørvik, 2014; Pearson et al., 2010), engagement (Cambria & Guthrie, 2010; Guthrie, Anderson, Alao, & Rinehart, 1999), and identity development as readers, writers, and scientists (Håland, 2017; Pappas, Varelas, Barry, & Rife, 2002; Tucker-Raymond, Varelas, & Pappas, 2013; Varelas & Pappas, 2006).

While promising, few studies have examined how an inquiry-based integrated science-literacy approach can be used in the service of critical pedagogy. Critical pedagogy is a broad project aimed at interrogating the ways dominant groups maintain power through the institution of school. Although obscured as objective or neutral, all forms of teaching and learning are governed by ideological beliefs that privilege particular people and ideas as more knowledgeable than others (DeMarras & LeCompte, 1995). Without interruption, standard forms of curriculum and instruction in U.S. schools privilege White, monolingual English, middle class cultural norms and marginalize the cultural, linguistic, and literacy practices of diverse student learners. The aims of critical pedagogy are to illuminate constructs that serve the interests of the dominant group, interrupt their reproduction

in school, and take action to change them (Darder, 2012; Giroux & Simon, 1988; Luke, 2019; McLaren, 1994).

Critical literacy is situated within critical pedagogy as an approach to using literacy to recognize oppressive ideologies, discourses, and practices in order to enact social change. Critical literacy is often connected to the work of Freire (1970), who believed literacy education could be used to “confront a culture of domination” (p. 54) and situated literacy pedagogy squarely within the social, cultural, and political worlds. Literacy is conceptualized as an ongoing engagement with the “word and the world” (Freire & Macedo, 1987), which requires individuals to “analyze, critique, and transform social, cultural, and political texts and contexts” (Luke, 2019, p. 354). Looking at literacy with this specific lens allows teachers and students to engage with the word and the world to confront injustice and work towards social change.

This review examines literature across integrated science-literacy learning, inquiry-based instruction, critical pedagogy, and critical literacy. By reviewing a specific body of literature related to these areas, I aimed to understand how an inquiry-based approach to science-literacy learning could function to support students’ critical investigations into the social, political, and environmental worlds around them. Reviewing recent educational research, I asked: How does literacy facilitate critical inquiry into the discipline of science in K-12 classrooms?

Background

Inquiry-based instructional models are often associated with scholars from the progressive education movement (Duke, 2016). Writing in the mid-1930s, Dewey (1938) proposed a theory of inquiry in which students’ experiences and interests served as the foundation for all teaching and learning. Dewey, along with other progressive educators of the time (e.g., Kilpatrick, 1921), believed that engaging students in authentic tasks would lead to high levels of learning across content areas. Similarly, literacy scholars argued that experiential learning created reasons to read and write (Smith, 1934; Whipple, 1925). Smith (1934) argued for an “experience method” of instruction where reading was “used as a tool to further the interests and activities of the children” (p. 218). Progressive educators proposed an alternative vision for education that centered the curriculum and instruction around students’ inquiries, interests, and experiential learning.

Decades later, Freire (1970) also proposed a pedagogical vision that centered students’ interests and experiences in the curriculum. Unlike progressive educators, however, Freire believed that dominant structures, systems, and ideologies were to blame for the kinds of decontextualized or “banking” (p. 53) forms of instruction common in school. Ongoing cycles of reflection and action were processes used to develop students’ consciousness of oppression and engage in political action that would lead to change. For Freire, inquiry was necessary to develop new understandings that could lead to liberation, as he believed that “knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other.” (1970, p. 53). Inquiry, as both a pedagogical process and way of being in the world, connected teachers and students together in a struggle for liberation, justice, and equity. Although inquiry-based instructional models are often associated with educators from the progressive movement at the turn of the century, Freire’s theory of critical literacy is equally important in understanding how inquiry-based instructional methods serve both student-centered and critical pedagogical purposes.

Defining Critical Inquiry

In this review, I use the phrase critical inquiry to capture pedagogical practices that center students' interests and experiences in the curriculum as a means to critique unjust power structures. Drawing on theories of critical pedagogy (Darder, 2012; Giroux & Simon, 1988; McLaren, 1994), critical literacy (Freire, 1970; Freire & Macedo, 1987; Luke, 2019), and sociocultural views of learning (Vygotsky, 1978), I define critical inquiry as a set of critical literacy practices used within classroom learning communities to engage with the sociocultural, political, and natural world. In this review, I specifically examine applications of critical inquiry within the discipline of science in K-12 contexts. The term "critical" signals pedagogical practices aimed at confronting oppressive and inequitable structures, ideologies, and discourses to realize greater equity and justice.

Method

The reviewed articles were selected and examined using a three-part process. In the first phase of article identification, I systematically searched for peer-reviewed articles related to the topic of critical scientific inquiry, limiting the search to studies published between 2000-2018 to examine contemporary instructional practices. I used key terms such as "science," "inquiry," "critical theory," and "social justice" on the databases Academic Search Complete and Education Source. I combined search terms in six different iterations to generate a total of 331 empirical and conceptual pieces related to the topic of this review. I also used bibliographic branching or the snowball technique (Ridley, 2008) to identify 10 additional studies referenced in two studies identified in the first search stage (Brown, 2017; Buxton, 2006).

Next, I began the second phase of article selection by applying a set of selection criteria. Because my focus was on critical inquiry in K-12 science classroom contexts, I first examined studies that explicitly mentioned "inquiry" as an instructional method in the title or abstract of the article (e.g., Buxton, 2006; O'Hallaron, Palincsar, & Schleppegrell, 2015). Within this large set of studies, I discovered theoretical differences between how the authors and I conceptualized critical inquiry. For example, rather than using inquiry as an instructional means to focus on students' interests and disrupt the status quo of classroom instruction, studies like Tong et al. (2014) used inquiry to support students' acquisition of pre-determined canonical science standards. These theoretical differences eliminated the largest number of studies from the broad search. In addition, I excluded ten articles that were not empirical and an additional small set of studies that examined critical inquiry outside of K-12 classroom learning contexts. It is important to note that three studies (Brown & Crippen, 2017; Laughter & Adams, 2012; Wilson-Lopez, Strong, & Sias, 2017) did not explicitly use the term inquiry, but described instructional practices that reflected this teaching method and were, therefore, included. After sifting through the original set of 331 studies using this selection criteria, I identified 11 studies to examine for the purposes of this review.

Once I identified these studies, I compiled a chart to organize aspects of the research process such as the theoretical perspectives, methods, and findings for each study. Using this chart, I identified themes relevant to the question of how critical inquiry was enacted in science content areas. As I developed themes, I reorganized the chart to categorize studies across emergent findings. This analysis, re-reading of the texts, and revision of salient themes produced three main findings, which I discuss further in the subsequent sections.

Findings

Across the studies I examined, three themes emerged that illuminated how literacy instructional practices could support critical scientific inquiry. First, students' interests drove science learning and pursuing those interests through critical inquiry created space to honor their "funds of knowledge" (Moll, Amanti, Neff, & Gonzalez, 1992). Second, critical inquiry invited students to challenge the official science curriculum, critique authoritative texts, and question who held expertise in the discipline. Finally, critical inquiry grounded learning in specific contexts that were ecologically and socially meaningful for students.

Centering Students' Interests and Sociocultural Knowledge

Similar to previous research on inquiry teaching, students' interests drove the teaching and learning experiences for students engaged in critical inquiry practices. In nine of the 11 studies, students were responsible for shaping the kinds of science learning experiences that unfolded in the classroom. For example, Owens et al. (2002) described how elementary and middle school students developed questions that were relevant to their lives, which launched their research investigations into various science topics. However, critical inquiry practices seemed to offer new, distinct advantages to students, namely that when students inquired into topics critically their sociocultural knowledge was a valued resource in developing scientific understandings. As educators continue to seek ways to honor and sustain students' cultural, language, and literacy practices in school (Paris, 2012), these studies shed light on how students can be recognized as powerful scientists, meaning-makers, and inquirers. Below I detail how this occurred in classrooms and also illuminate the tensions that emerged when typical power dynamics between teachers and students were disrupted in the design and implementation of critical inquiry.

Attending to students' sociocultural knowledge. Although culturally relevant pedagogies (CRP) that honor students' cultural backgrounds and experiences (Ladson-Billings, 1995) and inquiry-based science methods are promoted as best practices within critical educational research, the simultaneous enactment of both is rare (Brown, 2017). However, in studies examining critical inquiry practices, students' sociocultural knowledge was viewed as an asset that could further develop scientific understandings. For example, Brown and Crippen (2017) examined ways in which six secondary science teachers used CRP to connect students' home lives with science content learning. They found that teachers planned life science lessons that incorporated students' cultural traditions and practices, such as examining the effects of glucose using students' self-reported food preferences. While the authors explained that this kind of "microlevel culturally responsive knowledge" (p. 126) attended to students' cultural heritage, these practices did not extend to validating students' cultural knowledge in the curriculum.

Buxton (2006) also examined ways that teachers enacted scientific inquiry units that were culturally and socially relevant to students. However, in this study, teachers attended to students' specific critical inquiries in the moment they occurred, demonstrating a value for students' experiences that surpassed their own plans for teaching. In one lesson, preservice teachers planned an inquiry on the different types of fish local to the students' Louisiana coastal community. During this lesson, however, students articulated questions and concerns about water contamination, realizing that many of their families ate fish from these water sources. The teachers changed their teaching plans to follow the students' lead, validating both their concerns and outside-of-school experiences as important in the science curriculum.

In a much different study, sixth-grade students, who identified as members of African American and Latinx immigrant communities, intentionally partnered with their teacher to design scien-

tific inquiry units that attended to their cultural knowledge, expertise, and ways of being (Barton & Tan, 2009). In one unit, students shared their family food and cooking traditions, using this information to inquire into the kinds of plant species used as common food sources in their communities. Through shared inquiry into each other's familial practices, students connected their dietary traditions with family stories through oral history. As students shared family traditions, histories, and recipes, they noted the wealth of resources, knowledge, and diversity within the class. One student, Cindy, used this observation to critique dominant and oppressive discourses that group all "minorities" homogeneously (p. 57). For these students, cultural experiences were viewed as an asset to the science curriculum and a necessary component to investigate the scientific relevance of familiar plant species. These student-centered and culturally-centered inquiries also created space in the official school curriculum to address critical issues like stereotyping racially and ethnically diverse individuals.

These examples showed varying levels of attention to students' interests and sociocultural knowledge while simultaneously practicing critical scientific inquiry. While this is promising, scholars like Babaci-Wilhite (2017) have proposed that more research is needed to understand the effects of including students' home languages in the science inquiry curriculum. Increasingly, students come to school with a range of linguistic practices but are required to conform to English-only curricular demands (Makalela, 2018). Including students' home languages in scientific inquiry offers potential sites to support critical scientific inquiry and learning, as well as provide a means to deconstruct dominant scientific paradigms that may neglect indigenous or non-Western epistemologies in teaching and learning science in school.

Facing challenges in student-led critical inquiries. At times, centering students' interests and sociocultural knowledge in the science curriculum presented challenges for teachers due to time constraints and high-stakes testing pressures. In the two cases in which teachers collaborated with students to develop and enact critical inquiry, structural constraints and curricular mandates became sources of tension. For example, Barton and Tan (2009) noted that despite a successful creation and enactment of a critical inquiry unit, the teacher felt overwhelmed and unable to continue teaching in this way due to time constraints. For the teachers in Buxton's (2006) study who faced significant pressures to raise test scores at their elementary school, curricular mandates created roadblocks to designing a curriculum around students' interests and critical concerns. In one instance, the class abandoned an outside garden project after the school administration reprimanded teachers for straying too far from the curriculum that aligned to high-stakes assessments. Although students across these studies pursued issues related to science and social curricular content, these challenges highlighted the institutional constraints that make such instructional endeavors difficult.

Disrupting Notions of Authority and Expertise

Several studies highlighted ways that critical inquiry was used to address power. Through critical inquiry, students examined the canon of authoritative science texts from a critical perspective to question the expert/novice binaries. The theoretical perspective of critical literacy was developed with the purpose of serving as a tool to "confront a culture of domination" (Freire, 1970, p. 54). Across these studies, it is evident that critical inquiry supported these broad aims by serving as a tool to foster critical consciousness and resist the status quo. For the purposes of this review, I examine closely how critical literacy and inquiry practices were used to challenge traditional forms of science content and authored texts.

Content. Often science discourse is viewed as fixed and authoritative (Bazzul & Sykes, 2011). In school, science content can be constructed as a set of unquestioned facts students must learn (Osborne, 2010). For high school students in Wilson-Lopez et al.'s (2017) study, however, the

engineering curriculum served as a place to both engage “with and against the discipline” (p. 243). Student participants, who self-identified as Latinx and children of immigrant parents, critically read case reports, as well as physically engineered structures and designs. Students used the science curriculum and critical inquiry practices to analyze the ways in which engineered products had material consequences for the designers and those who used the engineered products. The way students read and interpreted engineered designs uniquely positioned them as active, rather than passive, consumers of scientific content knowledge.

In one particular unit in the same study, students inquired into the lack of cultural and socioeconomic diversity among the design team of a company that designed a holographic computer. Armed with this information, the students used what they knew about engineering principles to propose “counter designs” (Wilson-Lopez, et al., 2017, p. 241), which accounted for things like more thorough testing measures to ensure safe use for children and recycling procedures to dispose of materials using environmental stewardship practices. Critical inquiry served as a means to not only disrupt traditional forms of science content taught at school but supported students in imagining new and more socially-just futures through engineering and product design.

This study was one of the few in the review that supported students’ action and activism for change. Wilson-Lopez et al. (2017) argued that critical inquiry into engineered designs invited the students in their study to conceptualize discipline-specific instructional practices in new ways, explaining:

Through enacting both disciplinary literacy and critical literacy in K-16 engineering courses, students can be prepared to perform either as engineers or as active stakeholders, while at the same time moving toward changes that promote more equitable outcomes for all. (p. 244)

For these students, critical inquiry in engineering provided a path to use, as well as resist and disrupt, fixed content standards.

Texts. Critical literacy practices have been explored extensively in English language arts content areas (Janks, 2010; Vasquez, 2004), however three studies in this review extended these literacy practices into the discipline of science. Across each of these studies, students were invited to practice critical literacy by exploring texts through their own inquiry questions about whose knowledge and voice was promoted with authority in the text. O’Hallaron, Palincsar, and Schleppegrell (2015) examined the ways in which 23 elementary-aged learners inquired into the attitudes of authors who wrote their science texts. They examined the language practices of text authors to study how writers created authoritative tones in their compositions. O’Hallaron et al. (2015) argued that a critical reading of scientific informational texts was a way to democratize the curricular space and invite greater participation from students. Given the ways in which students are often excluded from full democratic participation in school due to test-centric curriculum and instructional practices (Au, 2008; Davis & Vehabovic, 2017), critical reading of scientific texts can foster more inclusive learning spaces.

Laughter and Adams (2012) were similarly concerned with the ways in which scientific texts were presented as authoritative. This researcher and teacher-researcher collaborated to invite students to examine individual, societal, and disciplinary biases embedded within science texts typically used in the curriculum. The authors grounded their rationale for critical inquiries in science as a way to increase student participation in the discipline, and as a way to raise students’ critical consciousness to respond to pressing social justice issues, such as racial discrimination. Together, sixth grade students and their teacher read *Space Traders* (Bell, 1992), a text that uses a science fiction parable to examine racism in the United States. After this whole-class reading and discussion, the class engaged in a close and critical reading of the science curriculum to identify biases embedded in the science curriculum. Studies like these highlight the utility of using literacy to foster authentic, discipline-

specific practices that mirror those used by members of the scientific community who often interrogate the credibility of sources of information to generate knowledge (Moje, 2015; Schwarz et al., 2017). Learning to analyze and evaluate sources of information are crucial skills needed to tackle the serious environmental, social, and political challenges facing our nation and world. These studies highlight that the school curriculum can be a place to foster critical literacy and inquiry practices that support disciplinary learning, as well as prepare students to make societal changes.

Expert/novice binary. In one study, critical inquiry disrupted ways in which students were positioned as novice in relation to the science curriculum. Otoide (2017) used action research to examine how her students took on disciplinary expertise in an inquiry-based unit of study. After sharing the story of “The Ignorant Schoolmaster” (Rancière, 1991), Otoide invited her sixth-grade students to pursue a science topic of interest by inquiring “through, with, and about” (p. 308) the text. Students began by reading a range of informational texts, then transitioned to questioning what perspectives were missing from the texts, and ended by self-reflecting on how this information was salient to their lives. This critical engagement with text not only led to new scientific discoveries but also new realizations about students’ expertise and agency in the discipline. The author explained, “Students displayed an awareness of accessing and applying their own intelligence by commenting and reflecting on their growth in the ability to learn, the benefits of teaching themselves and the freedom associated with executing their own intelligence” (p. 315). Proponents for inquiry-based teaching argue that engaging in practices specific to the discipline not only supports academic learning but makes accessible the norms, discourses, and literacy practices that are often obscured in the official school curriculum (Moje, 2015). Through inquiry, students can identify similarities between their work and the work that scientists do, helping them feel like expert participants in real disciplinary communities. In this particular study, the practice of critical inquiry in science repositioned students as knowledgeable, rather than novice, scholars.

Together, this small set of studies demonstrates the power of inviting students to critique, question, and converse with texts that are often seen as sources of information and “truth” (Luke, 2018). Yet, these studies also highlight the conflicting theoretical constructs undergirding different approaches to enacting critical inquiry in the science classroom. For O’Hallaron et al. (2015), critical reading held the potential for a more informed and engaged democratic citizenship, while Laughter and Adams (2012) imagined critical inquiry as an important step toward enacting social justice. As Janks, Dixon, Ferreira, Granville, and Newfield (2013) explain, “Critical literacy is about enabling young people to read both the word and the world in relation to power, identity, difference and access to knowledge, skills, tools and resources” (p. 225). Despite varying theoretical orientations, critical inquiry, as a form of critical literacy, provided students opportunities to disrupt structures and ideologies in the science classroom.

Learning in Context

Across the studies, contextually-based learning experiences were essential for the enactment of critical inquiry. Although research into classroom learning experiences presume a particular school-based context, these studies illuminated the importance of moving beyond the walls of the school to engage in scientific inquiry that attended specifically to students’ physical and sociocultural worlds. For example, in some instances, the classroom spaces were physically transformed to represent a new environment. The teacher and students in Barton and Tan’s (2009) study created a kitchen inside the classroom where they made appetizers in order to learn about nutrition alongside students’ cultural and familial culinary knowledge.

In other studies, students stepped outside the classroom walls to explore scientific content in the natural world. In studying three elementary teachers’ enactment of science-inquiry teaching,

Howes, Lim, and Campos (2009) found that one kindergarten teacher used a local pond throughout the year to teach science. Students' inquiries were grounded in activity and experience (Dewey, 1938), and according to the authors, "the sources of questions, and therefore of scientific inquiry, were not confined to texts and the teacher" (p. 212). Although students' inquiries were tied to real-world contexts, they all revolved around one particular pond, without consideration of how this ecosystem was similar or different to others in their community or environmental conditions that threaten habitats or species. Critical literacy, however, suggests students must engage in the broader social and political world as they learn to read the "word and the world" (Freire & Macedo, 1987), a pedagogical approach Buxton (2006) attempted to capture with elementary students who inquired into their local ecosystem.

The teachers in Buxton's (2006) study took a different approach. For the teachers at this elementary school, the enactment of "contextually authentic scientific inquiry" (p. 719) involved attention to both the physical and social aspects of context. In this study, students revitalized a school garden as they inquired into the lives of local plant and animal species. Context was also linked to students' social experiences and their inquiries spurred from experiences they had with family or friends, such as catching fish from local water sources. Buxton noted that students were highly engaged in these kinds of inquiries, yet their teachers faced tensions in developing and enacting a curriculum that was context-specific and aligned to students interests. This tension highlights the ways critical pedagogical practices disrupt traditional teaching structures, such as lesson planning in advance. For the teachers in this study, learning to adapt and respond to students was crucial for students to inquire into their local communities.

Wilson-Lopez et al. (2017) took a more radical approach by studying the ways in which high school students critically read the world of engineered designs. In this study, students and teachers seemed to bring the world into the classroom by examining a range of engineered products from both local and global communities. Throughout the unit, students asked critical questions, like "Who benefits and who pays?" (p. 239) as they researched various designs and the people (or companies) who engineered them. This deeply contextual inquiry into engineered designs inspired a raised consciousness for many of the students. For example, at the start of the unit, students believed that a blood filter used to fight Ebola was one of the best inventions of the year. However, through their critical inquiries into the product, they discovered that the filter was expensive and using the product for its engineered purpose in West Africa would be nearly impossible. The class also discovered the filter was designed in Europe and tested in Germany, far from the patients in West Africa who supposedly stood to benefit from it. Through critical inquiry, students uncovered the company's motivation for profit and concluded that engineering such a device led to inequitable access and health care outcomes. The authors argued that critical reading and inquiries into the world of engineered designs made content more accessible and meaningful to students, preparing them "to perform either as engineers or as active stakeholders, while at the same time moving toward changes that promote more equitable outcomes for all" (p. 244). Unlike Buxton (2006), Wilson-Lopez et al. noted the pedagogical power, rather than the constraints, this approach offered in the science classroom. This contrast illuminates the varying ways in which school structures and demands can impact students' engagement in critical scientific inquiry at school.

Discussion and Implications

Findings from this review indicate the powerful possibilities nestled within a critical inquiry approach to science learning. By using literacy as a tool to honor cultural diversity, critique authoritative texts, and engage with the natural and sociopolitical world, this body of scholarship points to the positive influence critical inquiry can have in students' learning of scientific and social issues.

Across this body of scholarship, critical inquiry created opportunities to put reading and writing to use, rather than developing literate practices as decontextualized skills. Across each study, critical inquiry opened new possibilities for students to engage in discipline-specific practices, such as pursuing scientific topics of interest and evaluating sources of information. These skills, however, were not the sole determinants for student learning. Instead, critical inquiry opened new pathways for students to disrupt the status quo, question forms of oppression, and redesign more just social futures. In this way, critical inquiry positioned students as agentic, powerful meaning-makers, armed with scientific knowledge and critical literacy skills to tackle pressing environmental, social, and political concerns.

These studies illuminate that specific components can support the design and enactment of critical inquiry in science education. First, students' full humanity as individuals with unique cultural, literacy, and linguistic practices were honored and recognized as essential components to engaging in critical scientific inquiry. Indeed, Freire (1970) believed that "apart from inquiry, apart from the praxis, individuals cannot be truly human" (p. 53). Given the ongoing forms of racial discrimination, language domination, and inequitable access to resources that students from low-income backgrounds experience in school (Kohli, Pizarro, & Nevárez, 2017), these studies highlight how the experiences and identities of students from racially, linguistically, and socioeconomically diverse backgrounds can be honored and respected as an integrated aspect of learning about the natural and sociopolitical world. Second, critical inquiry encouraged students to question and critique curricular content, texts, and power relationships that often go unexamined at school. Today, students must have access to this kind of education in school in order to confront the complex challenges of the 21st century as active and informed members of society. Finally, these studies pointed to the power of place and the importance of situating inquiry within both the natural and sociopolitical world. Critical inquiry offered a way to bring complex ecological and social realities into the classroom. In an increasingly global and technologically connected world, students' connection to real-world issues is imperative to their development as students and active citizens.

While this instructional practice arguably holds the potential to create inclusive, engaging, and powerful curricular spaces for students, the studies in this review also pointed to challenges and questions that remain in enacting critical inquiry in K-12 science learning contexts. First, further examination is needed to understand how teachers' beliefs and reflections on their own positions of power influence the ways they enact critical inquiry specifically and critical pedagogy more broadly. Although the teachers in Brown & Crippen's (2017) study developed a unit that was inclusive of students' cultures, the teachers stopped short of critically examining their own cultural practices or relationship to the dominant culture. None of the studies explicitly considered teachers' beliefs and knowledge even though these factors influence equitable classroom practices (Brown, 2013; Milner, 2017). Future research in this area would benefit from examining how teachers' beliefs, as well as their critical self-reflections, influence their enact of inquiry pedagogy.

In addition, only one study accounted for the ways in which critical inquiry instruction translated into tangible action for change. Wilson-Lopez et al. (2017) demonstrated how students engineered "counter-designs" (p. 241) to address the social inequity and environmental harm they discovered through their inquiries into engineering science. Aside from this important example, a paucity of research exists in the ways action and advocacy are realized as a part of inquiry practice in the classroom (Harste & Leland, 1998; Hoffman, 2017; Vasquez, 2004). These studies, although rich with possibilities for social, political, and environmental activism, illuminate the continued challenge of realizing such a vision in K-12 classrooms today. Future research may benefit from examining how children and youth use critical inquiry to advocate for change outside of the school walls as they attend to issues of equity and social justice.

The findings from this review suggest that curricular and instructional practices can be enacted to realize critical inquiry in K-12 classroom spaces. However, they also indicate that powerful structures like high-stakes testing mandates or authoritative discourses embedded in texts present serious roadblocks to pursuing critical inquiry in science. One implication of this review is that there is a need to support teachers as they navigate the complex process of uniting science learning with literacy and inquiry to interrogate critical social issues with students. Teachers in the reviewed studies desired support in planning curriculum (Barton & Tan, 2009), navigating school curriculum mandates (Buxton, 2006), and inquiring into their own cultural identities (Brown & Crippen, 2017). Teacher educators and researchers must be ready to meet the needs of pre- and in-service teachers engaged in critical pedagogical work by developing collaborative partnerships, sharing resources, and using critical tools of reflection together. A second implication of this review is to interrogate the purpose of critical inquiry in the classroom. These pedagogical practices, while supporting students' learning of science, can also be used to realize new educative goals, such as equipping students to engage in advocacy and action for greater environmental and social justice. Teachers, along with school, district, and university partners, can redesign inquiry pedagogy so learning that begins in the classroom continues long after a unit or school year ends.

Conclusion

This analytic literature review highlights the affordances, tensions and lingering questions that remain in advancing critical inquiry in the context of science education. It also sheds light on new ways literacy can be used as a tool to read both the word and the world (Freire & Macedo, 1987) in advancing broad goals for social justice. This review offers a beginning look at science learning that is aligned to students' interests, discipline-specific practices, and confronts oppressive structures. Using these varied models of critical inquiry, teachers and teacher educators can use literacy as a means to support student-centered and critical forms of scientific learning. At a time when there seems to be no shortage of environmental, political, and humanitarian crises in the world, this review offers a glimpse into what students, teachers, and education researchers can do to realize greater social transformation and change.

Anne Daly-Lesch, M.Ed., is a PhD candidate in Language and Literacy Studies at the University of Texas at Austin. Prior to graduate school, Annie worked as an elementary and middle school teacher for seven years in San Antonio and Austin, Texas and is a certified reading specialist. Annie's teaching experiences, professional and personal inquiries into critical social issues inform her current research interests. Utilizing theoretical frameworks such as critical race theory (Ladson-Billings & Tate, 1995; Yosso, 2005), critical literacy (Freire, 1970) and racial literacy (Guinier, 2004), Annie's research focuses on how elementary teachers enact critical literacy and racial literacy instruction with their students. Annie is also a graduate research assistant and assistant instructor and works to bring critical perspectives to methods courses with preservice teachers. Annie is an active member of professional organizations including the Literacy Research Association and the National Council of Teachers of English, as well as in her community, serving as a county voter deputy registrar and member of a local anti-racist teacher organization.

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The University of Texas at Austin
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Published online: July 2019

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Z.W. TAYLOR

The University of Texas at Austin

To cite this article: Taylor, Z.W. (2019). Web (in)accessible: Supporting access to Texas higher education for students with disabilities. *Texas Education Review*, 7(2), 60-75.

<http://dx.doi.org/10.26153/tsw/2285>

Web (In)Accessible: Supporting Access to Texas Higher Education for Students with Disabilities

Z.W. TAYLOR

The University of Texas at Austin

With the rise of Internet technologies since the early to mid-1990s, United States (U.S.) Congress amended Section 508 of the Rehabilitation Act of 1973 in 1998 to reflect the changing landscape of digital technologies and information accessibility for individuals with disabilities (28 C.F.R. § 35, 1998). Therein, nearly all postsecondary institutions in the U.S. were required to ensure that their websites were accessible, thus providing equal access to information and communication technology for individuals with disabilities: a public entity shall take appropriate steps to ensure that communications with applicants, participants, members of the public, and companions with disabilities are as effective as communications with others (28 C.F.R. § 35, 1998).

Under both Title II and Title II of ADA, postsecondary institutions must produce communication that is effective in both physical and digital settings, ensuring that people with disabilities have the same access to that communication as non-disabled people. In the twenty years since Section 508's amendment in 1998, individuals with disabilities have opened hundreds of court cases and formal complaints against institutions of higher education, charging that a wide variety of digital communications were not accessible and this lack of accessibility negatively impacted their postsecondary education (Carlson, 2018; LaGrow, 2017).

For instance, in 2010, an Arizona State University student who is blind, sued the university over its use of Amazon's Kindle e-reader technology. The lawsuit alleged that e-book technology did not include audible menus allowing individuals who are blind access to the educational content, and thus, the student was not able to navigate their Spanish 101 e-textbook (Parry, 2010). Moreover, advocacy groups for the deaf filed federal lawsuits against the Massachusetts Institute of Technology and Harvard University, claiming both institutions violated Section 508 and the Rehabilitation Act of 1973 by failing to provide closed captioning services for those who are deaf or hard of hearing (Lewin, 2015). Most recently, Jason Camacho—a blind man from New York—sued fifty colleges and universities, alleging that their institutional websites were not navigable using a screen reader, one form of assistive technology. According to the lawsuits, Camacho attempted to access information regarding admission requirements and degree programs, yet he was unable to successfully use his screen reader technology on institutional websites. This was due to each website missing metadata (McKenzie, 2018), or information linked to a web element on a webpage to describe what a web element is (e.g., picture, video, hyperlink), and what may happen if a user interacts with an element (e.g., clicking a hyperlink and being directed to a different webpage).

In response to the many concerns surrounding web accessibility for people with disabilities, in January 2017, the U.S. Federal Government adopted Web Content Accessibility Guidelines (WCAG 2.0) Levels of A and AA standards for all websites falling under the purview of ADA, including Title IV institutions of higher education (Grzymkowski, 2017). This adoption, which officially began on January 18, 2018, required institutions of higher education to comply with WCAG 2.0 Level AA web accessibility, meaning all postsecondary institutions in the U.S. must “create and publish digital content—web pages, documents, images, videos, audio” at level AA standards (LaGrow, 2017, para. 11). To meet Level AA, WCAG 2.0 outlined four core principles of web accessibility:

Perceivable: Information and user interface components must be presentable to users in ways they can perceive. (W3C, 2017, para. 1). Operable: User interface components and nav-

igation must be operable (W3C, 2017, para. 28). Understandable: Information and the operation of user interface must be understandable. (W3C, 2017, para. 53). Robust: Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. (W3C, 2017, para. 74).

For example, in terms of perceivable web content, WCAG 2.0 guidelines assert that time-based media must be captioned. Level A compliance requires time-based media, such as a video, maintain that “Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such” (W3C, 2017, para. 6). Institutions of higher education, however, must meet all Level A compliance standards in addition to the Level AA compliance standard requiring that “Captions are provided for all live audio content in synchronized media” (para. 8). In total, as of January 18th, 2018, institutions of higher education websites must meet over one hundred Level A and AA compliance standards to meet the compliance threshold and be deemed web accessible by the U.S. Government and the Department of Justice (LaGrow, 2017).

On top of the hundreds of court cases alleging web inaccessibility, recent higher education research has suggested that a wide variety of student-focused content is unreadable by its intended audience. For example, Taylor (2017a) found that the average readability of international graduate student admission materials on postsecondary websites were written above the 15th-grade reading level, with some materials written above the 19th-grade reading level. In another study that included a random sample of 100 articulation agreements between two- and four-year institutions in Texas, Taylor (2017b) found that 69% of all articulation agreements on postsecondary websites were written at or above the 16th-grade reading level. This unreadability also violates ADA, as WCAG 2.0 Guideline 3.1 asserts that text ought to be readable and understandable by a wide audience (W3C, 2017). According to WCAG 2.0 standards, “content should be written as clearly and simply as possible,” for its readability to adhere to the “Understandable” principle (WC3, 2016b, para. 2). Content that is more advanced than lower secondary education readability level requires supplementary content to clarify and simplify the material, and content requiring an advanced education should be limited (WC3, 2016b). WCAG 2.0 defines lower secondary education level as between 7th- and 9th-grade reading comprehension levels and advanced education as the 12th-grade reading comprehension level or higher (WC3, 2016b), meaning that the majority of content in Taylor’s studies (2017a, 2017b) would not have met Level AA compliance standards as required by federal law.

Moreover, Taylor (2018a) articulated that across a random sample of 335 public and non-profit private four-year institutions in the U.S. the average readability of international undergraduate admission materials on postsecondary websites was near the 14th-grade reading level, and only 1% of institutions provided content in languages other than English. WCAG 2.0 standards also include the “Language of parts,” which requires that “user agents can correctly present content written in multiple languages” (WC3, 2016a, para. 2). In addition, states with large Spanish-speaking populations have passed laws to ensure that web content is translated into multiple languages as part of web accessibility (Texas Administrative Code, Chapter 206, 2012).

For instance, State of Texas Electronic and Information Resources (EIR) standards assert that all state agencies must follow ADA Section 508 guidelines when updating and changing their state-supported websites. The same standards demand that institutions of higher education “must make a reasonable effort to ensure that Spanish-speaking persons of limited English proficiency can meaningfully access state agency website information in accordance with provisions of Texas Government Code §2054.116” (Texas Administrative Code, Chapter 206, 2012, para. 1). In addition, state agencies, such as institutions of higher education, “should consider providing the content of their websites in the primary language or languages used by the people using the website” (Texas Administrative Code, Chapter 206, 2012, para. 2). Considering Taylor’s (2018a) translation study,

WCAG 2.0 standards, and State of Texas laws, it is likely that many Texas postsecondary institutions in the study were in violation of both federal and state laws regarding the translation of web content for audiences of diverse language backgrounds and abilities.

Therefore, this case study serves as an early audit of postsecondary websites as of January 18, 2018, the day in which WCAG 2.0 Level AA compliance was mandated as part of Section 508 (LaGrow, 2017) to learn whether postsecondary institutions composed accessible websites for people with disabilities and people who are not fluent in English. Specifically, this study sought to answer two research questions (RQ):

RQ1: Had Title IV institutions of higher education in Texas published web accessible websites by January 18th, 2018 as mandated by the amendment of Section 508?

RQ2: If applicable, what are problematic elements of these institutional websites for people with disabilities?

By answering these two questions, both researchers and practitioners—in Texas and beyond—may better understand postsecondary websites and the hurdles they may pose to people with disabilities. As a result, these institutions may be held accountable for their digital communication with people with disabilities, possibly resulting in a more equitable digital landscape for people with disabilities attempting to access higher education in the United States.

Literature Review

As of April 2019, no extant research has specifically addressed the web accessibility of the websites of Title IV institutions of higher education in Texas. However, educational researchers in the fields of disability studies, computer science, and technology have produced several analyses which guide and provide context for this study. Outside of U.S. higher education contexts, one of the earliest web accessibility studies was Kelly's (2002) work focused on United Kingdom (U.K.) university websites (N=162). In the work, Kelly (2002) learned less than 3% of U.K. university websites were compliant with Level AA standards outlined by the 1.0 version of WCAG. Kelly (2002) utilized the Bobby™ web accessibility tool and discovered that the majority of web accessibility errors occurred as a result of images missing alt text, or, informative text that tells an Internet user what is being shown on the screen if the user cannot visually access the content.

Specific to U.S. institutions, Thompson, Burgstahler, and Comden's (2003) web accessibility analysis audited 102 public, four-year U.S. institutional websites. Engaging with the most robust web accessibility standards of the day, Thompson et al. (2003) evaluated each website using human evaluators who utilized several assistive technologies which have since been replaced with more advanced, modern technology. However, Thompson et al. (2003) was able to audit 1,103 different webpages across 102 unique institutional websites representing one of the most robust human evaluations of postsecondary websites to date. Of the most critical findings, Thompson et al. (2003) found that one human evaluator determined 182 webpages were web accessible and compliant with WCAG 1.0 standards, while a different human evaluator determined that only 40 webpages were WCAG 1.0 compliant using the same scale of web accessibility. Here, Thompson et al. (2003) reasoned that human evaluators may render different web accessibility judgements using seemingly objective criteria, speaking to the need for web accessibility studies to use a combination of human and machine evaluation to improve the accuracy and reliability of research findings in the field.

In the first longitudinal evaluation of the web accessibility of U.S. institutional websites, Hackett and Parmanto (2005) gathered web accessibility data from 1997 until 2002 across 45 institutional websites. All 45 institutions were members of the Association of American Universities and were considered elite, well-resourced institutions by the researchers. Hackett and Parmanto (2005) discovered that as Internet technology continued to evolve from 1997 to 2002, websites often be-

came increasingly inaccessible for people with disabilities, pointing to the necessity for regulatory laws to keep pace with advancing Internet technologies. These websites integrated the latest technology without ensuring that the communication on the website was accessible. Hackett and Parmanto's (2005) findings also foreshadowed the most recent Section 508 amendment that was an effort by the U.S. Congress 508 to minimize the impact of evolving technologies on the web accessibility of information for people with disabilities.

Shortly after 2002, the World Wide Web Consortium developed WCAG 2.0 standards, and Harper and DeWaters (2008) used these standards to analyze 12 four-year U.S. institutions. The researchers found that only one of 12 met Level AAA WCAG 2.0 standards, while another four of the 12 institutions did not comply with Level A, Level AA, or Level AAA. This theme of varying levels of WCAG compliance continued in the work of Flowers, Bray, and Algozzine (2011), as these researchers found 23% of a sample of 253 two-year institutional landing pages were accessible for students with disabilities and compliant with the most recent WCAG 2.0 standards. In a study which yielded even fewer WCAG compliant websites, Erickson et al. (2013) selected a random sample of 30 two-year institutions and learned less than 1% of these institutions' homepages adhered to Section 508 and WCAG 2.0 standards.

Extending the work using WCAG 2.0 standards, Thompson, Burgstahler, and Moore (2010) performed a longitudinal study akin to Hackett and Parmanto's (2005) foundational work. Therein, Thompson et al. (2010) embarked on a five-year study across 127 four-year U.S. institutions. The researchers found—echoing the findings of Hackett and Parmanto (2005)—that technology evolution rendered it difficult for institutional websites to maintain WCAG 2.0 compliance. Specifically, Thompson et al. (2010) noticed a rapid decrease in keyboard accessibility across the sample because of technology evolution, though web accessibility professional development and staff trainings helped marginally improve web accessibility. Yet, Thompson et al. (2010) asserted there was not a significant difference in the web accessibility of websites whose staff received professional development and training in web accessibility and those who did not.

Building upon the work of Thompson et al.'s (2003) study, Wisdom et al. (2006) interviewed staff working in Oregon community colleges regarding their knowledge of web accessibility. Wisdom et al. (2006) discovered that experienced, information technology (IT) staff and disability/student services staff held the most knowledge regarding disability laws and services, including web accessibility and WCAG standards. However, these IT and disability staff members did not often collaborate to share knowledge and ensure accessibility websites across multiple units on campus. Here, Wisdom et al. (2006) encouraged communication between campus units to share knowledge and collaborate with all members of a campus community in an effort to collectively improve web accessibility and disability services in general. In all, prior research has suggested U.S. institutions of higher education have struggled to publish and maintain web accessible websites given changes in technology (Hackett & Parmanto, 2005; Thompson et al., 2010) and a lack of professional development and practitioner knowledge of the subject (Thompson et al., 2003; Wisdom et al., 2006).

Most recently, Taylor and Bicak's (2019) analysis of community college web accessibility found that across a random sample of 325 community college websites, no single institution's landing page was free of WCAG 2.0 Level A errors. Similarly, Taylor's (2019) evaluation of the web accessibility of historically-Black college and university (HBCU) websites found that 94 of 100 HBCU websites were not ADA compliant and contained at least one WCAG 2.0 Level A error, with the average HBCU landing page containing 62 WCAG 2.0 errors.

Ultimately, given the nature of technology evolution and the lack of research focused on the web accessibility of Texas postsecondary websites, this study is timely. In addition, this study fills an important gap in the literature and evaluates the web accessibility of Texas higher education websites

to inform both the research community and practitioners on how to better support people with disabilities and their access of higher education in the state. As a result, Texas may be able to facilitate greater postsecondary access for students with disabilities, rendering the state of Texas a more equitable and inclusive one.

Methods

The following sections detail how the author identified the study's sample size, data collection and organization procedures, and how this study's limitations could inspire future research into the web accessibility of higher education websites.

Sample

Postsecondary institutions in Texas were selected for three reasons: size, population, and history. First, Texas is home to the fifth most postsecondary institutions (259), including three of the largest community college systems in the nation (Austin Community College, Houston Community College, and Lone Star College), and two of the country's largest public university systems (University of Texas System and Texas A&M System). Second, Texas is home to millions of native Spanish speakers, and the Texas legislature has drafted specific legislation to ensure that web content is readable or accessible for this population (Pew Research Center, 2014). Third, in recent years, the Texas Education Agency has struggled to meet federal guidelines and adhere to federal law concerning the education of students with disabilities in Texas schools (Kamenetz, 2018). Ultimately, postsecondary institutions in Texas constituted a large sample whose diverse population, educational landscape, and history justify this study and its aims.

Data Collection and Analysis

Postsecondary institutions in Texas were located using the Integrated Postsecondary Education Data System (IPEDS), a large database administrated by the U.S. Department of Education to allow researchers access to national-level data in one convenient online location (National Center for Education Statistics, 2018). As Section 508 pertains to institutions receiving Title IV funds, only Title IV institutions in Texas were included in the sample. An overview of this study's sample can be found in Table 1 below:

Table 1

Institutions of higher education in Texas, by sector (N=259)

<u>Institutional sector</u>	<u># of institutions (% of sample)</u>
Public, four-year or above	47 (18.1%)
Private, not-for-profit, four-year or above	66 (25.5%)
Private, for-profit, four-year or above	29 (11.2%)
Public, two-year	60 (23.2%)
Private, not-for-profit, two-year	6 (2.3%)
Private, for-profit, two-year	51 (19.7%)

Once all institutions were identified, each institution's .edu landing page hyperlink was located using Google and cross-referenced with IPEDS to ensure only official institutional websites were analyzed and uploaded into a database. Landing pages were examined per Bradley's (2017) exploratory study focused on measuring the web accessibility of higher education websites, extending recent work in the field (Taylor & Bicak, 2019; Taylor, 2019). These landing page hyperlinks were inputted into Tenon (www.tenon.io), a robust web accessibility software program which runs 74 WCAG 2.0 tests of all four principles of web accessibility (operable, perceivable, understandable, and robust) at Level A, AA, and AAA to measure a website's web accessibility. Upon analyzing a hyperlink, Tenon reports on which Level A, AA, and AAA errors appear within the hyperlink's markup language, such as HTML5 or Java. Prior studies have also used Tenon to evaluate web accessibility, finding Tenon to be a robust and accurate software program (Taylor & Bicak, 2019; Taylor, 2019). Once Tenon was used to generate web accessibility error reports for each .edu hyperlink, these reports were merged into a database to organize the errors by institution sector (e.g., public or private, two- or four-year) and create the tables of findings.

Per Taylor's (2017a, 2017b, 2018a, 2018b) foundational studies in readability, the same .edu hyperlink was inputted into Readability Studio, a quantitative linguistics software program to measure the English grade-level readability of each homepage and to learn whether the homepages featured an embedded language translator, such as Google Translate or Adobe Muse. Readability levels were inputted into the database for analysis and organization of readability level by institutional sector. This database is available from the author upon request.

Limitations

This study's primary limitations are its sample size and the web accessibility auditing software used to analyze each institution's website. Although 259 institutions represent one of the most robust sample sizes of any web accessibility study in the field of U.S. higher education, institutions of higher education could vary from state to state or region to region. As a result, future studies should expand upon this study's sample size and analyze institutional websites from other regions and/or states in the United States. Moreover, there are hundreds of web accessibility auditing programs available at little or no cost, and related studies suggest that web accessibility studies could pair machine or software programs alongside human auditors to capture a more comprehensive understanding of web accessibility (Hackett & Parmanto, 2005; Taylor & Bicak, 2019; Thompson et al., 2003). Subsequently, future research could assess web accessibility using a combination of machine or software programs and human auditors to provide the educational community with a more in-depth and nuanced understanding of web accessibility, even though such studies would require much more time and a possible monetary investment depending on the software and human resources required.

Findings

The English grade-level readability, translation, and web accessibility of landing pages for postsecondary institutions in Texas (N=259) are displayed in Table 2 below:

Table 2

Descriptive statistics of readability, translation, and web accessibility of landing pages for institutions of higher education in Texas, by institutional sector (N=259)

<u>Institutional sector</u>	<u>Readability mean, high, low, standard deviation (by grade level)</u>
Public, nonprofit, four-year (n=47)	10.6, 16.1, 8.6, 1.3
Private, nonprofit, four-year (n=66)	10.5, 19, 7.6, 1.9
Private, for-profit, four-year (n=29)	12.8, 19, 9, 3.5
Public, nonprofit, two-year (n=60)	9.9, 16.5, 6.9, 1.6
Private, nonprofit, two-year (n=6)	10.7, 11.7, 9.8, 0.9
Private, for-profit, two-year (n=51)	11.5, 14.7, 7.9, 1.7
<u>Institutional sector</u>	<u>Translation of landing page (% of population)</u>
Public, nonprofit, four-year	2%
Private, nonprofit, four-year	3%
Private, for-profit, four-year	3%
Public, nonprofit, two-year	12%
Private, nonprofit, two-year	0%
Private, for-profit, two-year	2%
<u>Institutional sector</u>	<u>Web accessibility errors (mean, high, low, standard deviation of errors per landing page)</u>
Public, nonprofit, four-year	29.2, 242, 2, 38.1
Private, nonprofit, four-year	43.4, 281, 2, 40.7
Private, for-profit, four-year	33.8, 143, 8, 30.4
Public, nonprofit, two-year	47.6, 225, 6, 39.1
Private, nonprofit, two-year	30.2, 44, 10, 13.9
Private, for-profit, two-year	29.3, 109, 5, 18.9

Data in this study suggest private, for-profit, four-year institutions published the most difficult websites to read at the 12.8th-grade level, whereas public, two-year institutions published the simplest websites to read at the 9.9th-grade level. Public, two-year institutions were most likely to

include a language translator on their landing page (12%), although few institutions in this study translated web content for people who are not English fluent. Omitting a translator widget or failing to provide Spanish-language content may violate the Texas' EIR laws which govern polylingual online content provided by institutions of higher education. Finally, with regards to web accessibility, public, four-year institutions published the most web accessible websites with an average of 29.2 errors per landing page. No institutions in this study had fewer than two errors, and no institutional landing pages were Level AA-compliant per Section 508. However, it is notable that a number of institutions only had between two and eight WCAG 2.0 errors on their landing pages, very nearly achieving Level AA compliance.

Descriptive statistics of web accessibility errors by frequency and institution are displayed in Table 3 below:

Table 3

Descriptive statistics of web accessibility errors of landing pages for institutions of higher education in Texas, by error type and institutional sector (N=259)

<u>Errors, by type, all institutions</u>	<u># of errors, % of all errors (n=9,346)</u>
Operable, Level A	3,964 (42.4%)
Robust, Level A	2,644 (28.3%)
Perceivable, Level A	1,738 (18.6%)
Understandable, Level A	425 (4.5%)
Operable and robust, Level A	340 (3.6%)
Operable, Level AA	134 (1.4%)
Perceivable, Level AAA	80 (.92%)
Perceivable and robust, Level A	20 (.28%)
<u>Most common errors, by sector</u>	<u>First, second most common error type</u>
Public, nonprofit, four-year (n=47)	Operable, Level A (691 errors) Robust, Level A (319)
Private, nonprofit, four-year (n=66)	Operable, Level A (1,062) Robust, Level A (913)

Table 3, Cont'd

Private, for-profit, four-year (n=29)	Operable, Level A (301) Understandable, Level A (188)
Public, nonprofit, two-year (n=60)	Operable, Level A (1,342) Robust, Level A (668)
Private, nonprofit, two-year (n=6)	Operable, Level A (11) Robust, Level A (91)
Private, for-profit, two-year (n=51)	Operable, Level A (552) Robust, Level A (455)

The most common errors across all sectors were “Operable, Level A” errors, comprising 42.4% of all errors in this study. “Robust, Level A” errors were the second most common across all sectors except for private, for-profit, four-year institutions, in which “Understandable, Level A” errors were the second most common.

It is important to note that four WCAG 2.0 errors were responsible for most of the errors in this study’s sample. Per Tenon’s testing, there were 1,736 “Operable, Level A” errors in which hyperlinks had a title attribute that was the same as the text inside the link, leading to unnecessary wordiness for assistive technologies and offering no benefit to the user. Similarly, there were 1,369 “Robust, Level A” errors in which the landing page’s ID attribute value was used more than once. This is problematic if the ID is being used to reference a user interface control, which can cause issues for users with assistive technologies. There were also 1,111 “Operable, Level A” errors in which links had no text in them, meaning that users could not use an assistive technology to access information about the link. Finally, there were 1,065 “Robust, Level A” errors in which a hyperlink had an invalid reference, meaning the user would be unable to use an assistive technology to learn whether that link led to another webpage, file, video, image, or other form of digital media. In all, these four Level A errors were responsible for 56.5% of all errors in this study.

Discussion

This study’s findings answered both research questions. First, data in this study suggests that no single Title IV institution of higher education in Texas published an entirely accessible website by the designated date of January 18th, 2018 from the amendment to Section 508. Moreover, this study echoes recent research finding that college and university websites are rarely accessible for students with disabilities (Taylor & Bicak, 2019; Taylor, 2019). Speaking to litigation faced by other institutions across the country, a lack of web accessibility has provoked dozens of lawsuits after the January 18th deadline, alleging that Title IV postsecondary websites have not been accessible for people

with disabilities (McKenzie, 2018). From here, Texas institutions may be publishing inaccessible websites for people with disabilities, not only limiting the education potential of these students but also opening up the possibility that Texas institutions could face ADA-related lawsuits in the future unless they take notice and make changes.

Regarding the second research question, data from this study suggest Title IV Texas institutional websites may be readable by high school-educated audiences, but these websites are rarely translated into any other language beyond English and are not robust nor detailed enough for people with disabilities to access all of the digital content that non-disabled people could. Given the Texas' Electronic Information Resource (EIR) laws, these findings suggest Texas institutions are not supporting English-language learners or people with disabilities on their institutional websites—both are violations of Texas EIR laws and the Americans with Disabilities Act (1990). Subsequently, these findings may help explain the minoritization of English-language learners and people with disabilities in the state of Texas, perpetuating a hegemonic, exclusive system of higher education in the United States.

Connecting to prior research, Kelly's (2002) study found that many U.K. university websites failed to provide informative alt text for images, and this study also found many missing alt text attributes on Texas postsecondary websites. Similarly, Thompson et al. (2010) found that many web accessibility issues apparent on U.S. institutional websites involved a lack of keyboard assistive technology integration. This study also found that many WCAG 2.0 errors appeared on Texas postsecondary websites involving a lack of keyboard technology and assistive technology integration, echoing prior work (Taylor & Bick, 2019; Thompson et al., 2010). Perhaps changing and evolving Internet technologies have continued to plague postsecondary websites as evidenced by Hackett and Parmanto (2005) and later Thompson et al. (2010), as it seems that Texas postsecondary websites suffer from the same shortcomings discovered in previous studies.

Thompson et al. (2010) learned that providing professional development and web accessibility training to staff did not drastically improve the web accessibility of certain institutional websites. However, such professional development and training seems essential to the livelihood of U.S. institutions of higher education, including those in Texas, given the amount of litigation faced by institutions (McKenzie, 2018). This study suggests that institutions of higher education in Texas ought to prioritize web accessibility and ensure that all practitioners with website editing permission are trained on how to best publish web accessible content. Beyond the threat of litigation, people with disabilities and people with home languages other than English may be routinely discriminated against due to a lack of accessible information online. If Texas postsecondary education desires to be an inclusive, supportive system (Texas Higher Education Coordinating Board, 2019), perhaps it is worthwhile to invest in web accessibility—and the people behind the building of the websites—in order to truly include and support people with disabilities and of diverse language backgrounds on their quest toward postsecondary education.

Implications for Practitioners

Data in this study suggest postsecondary institutions in Texas did not publish web accessible websites per WCAG 2.0 standards and federally-mandated Section 508 guidelines as of January 18th, 2018. Although many practitioners working in higher education are not web developers, nor do they have extensive experience in web accessibility, publishing a web accessible website can be achieved.

First, regarding readability, there are free and widely-available readability technologies that can allow practitioners to audit their web content for readability before it is published on an institutional website. A popular readability measure, the Flesch-Kincaid Grade Level Test, is built into every Microsoft Word program. Moreover, websites such as www.readable.io, allows users to upload

text into a fillable online form to learn how grade-level readable the text is before publication. In addition to English-language tests, the Gilliam-Pena-Mountain test (Gilliam, Pena, & Mountain, 1980) and Sol Spanish test (Contreras, 1999) are two common Spanish-language readability measures used to determine the grade-level readability of Spanish-language web content.

To produce native language content for English-language learners, Google Translate is free for practitioners to embed into their institutional websites with the help of their institution's web development team. Having been in use for over a decade, Google Translate has been proven to be nearly as accurate as human translators when translating English to Spanish, Chinese, German, and Italian (Tobin, 2015; Turner, 2016). Language translation technologies such as these will only continue to improve with use and other technological advancements; therefore, practitioners should consider employing these free technologies on their institutional website to render their website more accessible for an ever-growing population of U.S. postsecondary students: English-language learners (Pew Research Center, 2014).

Finally, no postsecondary institutions in this study published a Section 508 compliant website by the January 18th, 2018 deadline. Pilot studies have demonstrated how difficult web accessibility can be (Bradley, 2017). However, web accessibility technologies have advanced in recent years and many are now freely available and easy to use for those unfamiliar with web development and programming (Taylor, LaRonde, & Taylor, 2019; Taylor, 2018c). Tenon's web accessibility software (www.tenon.io) is simple to use and does not require much knowledge of web language. Yet, this technology is freemium, which means practitioners would need to purchase a license to regularly use the software (Taylor, 2018c). Alternatively, Deque Systems has created a web accessibility software tool called "aXe," which is a Chrome and Firefox browser add-on (Deque Systems, 2017). Users simply need to download the browser add-on, navigate to a webpage on their website, open the add-on, and learn which web accessibility errors they need to address with their web development professionals. These aforementioned tools are easy to use, inexpensive or free, and can work to make web accessibility a reality for students with disabilities across all postsecondary institutions in the U.S.

However, it is critical to note that institutional websites are only one form of communication. Improving web accessibility for minoritized populations, such as students with disabilities and English-language learners, does not address all forms of communication that these students rely on to access higher education and earn their degrees. Institutional web accessibility must be part of a larger, institution-wide initiative to improve communication in the written, verbal, and digital form to increase access to higher education for these student populations.

Conclusion

Ultimately, postsecondary institutions in Texas should immediately focus on the web accessibility of their websites to increase access to higher education for people with disabilities and English-language learners, specifically native Spanish speakers. Similarly, other states should heed the federal call for web accessibility and begin to evaluate how web content makes its way onto institutional websites. However, for as web (in)accessible as postsecondary websites may be, there exists a wealth of free, easy-to-use technologies to help practitioners make postsecondary education accessible for many minoritized people in U.S. society. For people with disabilities or English-language learners, successfully accessing postsecondary content on the Internet could make the difference between someone enrolling in an institution, earning their degree, and living a healthy and fulfilling life. In short, minoritized people should not have their educational dreams limited by inaccessible online information.

Of web accessibility, Bradley (2017) suggested that, “keeping higher education websites accessible is hard to do” (para. 1). However, given the findings of this study and emerging web accessibility resources, practitioners should not only work to comply with federal law but also work to make higher education truly web accessible, ushering in a new era of equity in higher education.

Z.W. Taylor, M.A., M.S., is a PhD candidate at The University of Texas at Austin. His research interests include linguistics in higher education, particularly pre-college information addressing first-generation college students and English-language learners. His work has been published by the *Community College Journal of Student Affairs Research and Practice*, *Journal of College Student Development*, and *Teachers College Record*, among others.

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