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FROM THE EDITORS

Educational planning articles in this issue relate to educational planning problems in teacher workforce diversification, educational leadership program redesign, U.S. international student organization and location, and research in educational facilities.

In the first article of this issue, Goings, Walker and Cotingola-Pickens argued that without considering school and district leaders, teacher workforce diversity initiatives would not have a long-term systemic impact. The authors discussed the barriers to recruiting and retaining a diverse teacher workforce and identified the factors that were found to influence the recruitment and retention of racial diversity of teachers at the pre-service and in-service levels.

Johnson and James highlighted researcher and practitioner perspectives on the most impactful principal preparation components. These perspectives were aligned to literature in the field and used to inform educational planning during a leadership program redesign. Their study involved interview design to gain the participants' unique perspectives of what should be included in the program redesign.

Referencing international students in the United States, Yao and Tong investigated the places of origin of international students and their distribution in the U.S. higher education. The results of the study showed that a larger proportion of international students came from Asian countries and the states with larger international student populations experienced a faster growth in the population of international students over the past five years. These significant findings with others have great implications for educational planning.

In the last article of this issue, Earthman examined methodological differences in research on the relationship between school building condition and student achievement. He analyzed the research approach of each of the referenced studies and claimed that the differences in research findings might lie in the methodology employed. The most important difference might be in how the building was assessed and the instrument utilized to make that assessment.

Articles selected for publication in this issue have explored educational planning issues of P-12 schools and higher education levels. Horizontally, they cover a wide area of interest from teacher diversity, to higher education program redesign, international student perspectives and educational facility research. The major themes carried in these articles have had special implications for educational planning. Through the dissemination of these recognized themes in this platform of Educational Planning, we, educational planners, enjoy and benefit from these sharing experiences.

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SCHOOL AND DISTRICT LEADERS' ROLE
IN DIVERSIFYING THE TEACHER WORKFORCE

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ABSTRACT

Diversifying the teaching profession has garnered attention from researchers, policy makers, and educational stakeholders. However, missing within this conversation is the role of school and district leaders in diversifying the teaching profession. We argue that without considering school and district leaders, diversity initiatives will not have a long-term systemic impact. Thus, this article fills in a gap in the literature on this topic. First, we provide a brief overview of the current racial and ethnic demographics of the teaching workforce and student population and discuss the barriers to recruiting and retaining a diverse teacher workforce. Second, we highlight the factors that have been found to influence the recruitment and retention of racial diversity of teachers at the pre-service and in-service levels. Lastly, we provide recommendations for school-based and district leaders on how they should plan for diversifying their teacher workforce.

INTRODUCTION

Over the three decades, researchers, policy makers and practitioners have discussed the importance of increasing the racial and ethnic diversity in the U.S. teaching profession (Goings & Bianco, 2016; U.S. Department of Education, 2016). Unfortunately, the teaching workforce has remained predominantly White. As a result, stakeholders have called for the increased representation of teachers of color. Currently, they only comprise 17% of the teaching workforce while students of color represent over 50% of the public student population (U.S. Department of Education, 2016).

As school districts seek to diversify their teacher workforce, there are two important questions to consider: Why is there a need to diversify the teaching workforce? What are the benefits of a multi ethnic/racial teaching workforce? Fortunately, researchers have explored these questions and have provided empirical evidence that highlights the benefits and need to diversify the teaching workforce. For instance, Gershenson, Hart, Lindsay and Papageorge (2017) found in their analysis from two states of student-teacher same-race matching that, for Black students who had a same-race teacher, they performed better on standardized tests and their teachers had more positive perceptions of them as students than Black students who did not have a same-race teacher. Additionally, Easton-Brooks, Lewis and Zhang (2009) found similar findings for a nationally representative sample of kindergarten African American students. In their study, they found that students who had an African American teacher had higher reading scores than those students who did not. Researchers have also found that while White teachers do have the ability to teach students of color, it is important for students of color to have access to teachers who share similar ethnic/racial experiences (Bristol, 2015; Goings & Bianco, 2016; Walker, 2016).

Though students of color have been found to benefit from having access to a diversified teaching workforce, having access to teachers of color is also important for White students (Bryan

& Ford, 2014). As Villegas and Irvine (2010) suggested in their analysis of diversifying the teacher workforce, "seeing people of color in professional roles communicates to White students that adults of racial/ethnic minority background are successful and contributing members of society" (p. 177). Moreover, a recent study by Cherng and Halpin (2016) investigated student perceptions of their minority and White teachers. They suggested that White students have more positive perceptions of their Black and Latino teachers than their White teachers. More specifically, the researchers found that students believed their Black teachers more than their White teachers held them to "high academic standards and support their efforts . . ., to help them organize content…, and to explain clearly ideas and concepts and provide useful feedback" (p. 411). Given the impact that teachers of color can have on all students, there has to be more of a concerted effort to change these workforce trends.

Nationally, researchers have focused extensively on understanding the lack of representation of teachers of color in the pipeline. For instance, scholars have investigated recruiting and retaining teachers of color (Achinstein, Ogawa, Sexton, & Freitas, 2010; Bryan & Ford, 2014; Goings & Bianco, 2016), experiences of students of color in teacher preparation programs (Amos, 2016; Goings, Bristol, & Walker, in press; Sleeter, 2001), in-service experiences of teachers of color (Bristol, 2018; Gist, 2014; Lynn, 2006), retention of teachers of color (Ingersol, May, & Collins, 2017), and attrition of teachers of color (Ingersol, Merrill, & May, 2014). While research in this area has increased, it is primarily focused on how to recruit more teachers into the profession and understanding why teachers stay or leave. While this is important, a glaring omission from this scholarly discourse is the role the school-based and district level leaders have in diversifying the teaching workforce. Moreover, there has been limited discussion about how school and district-level leaders plan to support the unique needs of teachers from a variety of ethnic and racial backgrounds. Thus, this article seeks to add to this conversation by exploring the role that school leaders (both district and school level) have in supporting efforts to diversify the workforce.

In this article we first provide a brief overview of the current racial and ethnic demographics of the teaching workforce and student population. We then turn to providing the factors that have been found to influence the recruitment and retention of racial diversity of teachers at the pre-service and in-service levels. Lastly, we provide recommendations for school-based and district leaders on how they should approach diversifying their teacher workforce.

EXPLORING RACIAL DIVERSITY DEMOGRAPHICS OVER TIME

Over the last few years, policymakers, pundits, and educators have focused on studying the shifting racial and ethnic demographics in the United States. In particular, Colby and Ortan's (2014) U.S. census analysis suggests that people of color will become the majority of US citizens by 2040. The findings mirror the recent population shift in public schools nationwide, which are experiencing a drastic turn in their ethnic and racial composition. More specifically, US public schools are projected by 2022 to experience an increase in Black, Hispanic, Asian/Pacific Islander, and multi-racial students while simultaneously having a decrease of White student enrollment (Hussar & Bailey, 2013).

As the racial and ethnic demographics in US public schools have shifted, the teacher workforce has lagged behind because of uneven recruitment and retention efforts. According to the US Department of Education (2016) between the 1987-88 and 2011-12 school years there has been a five percent decrease in White teachers. However, the only racial/ethnic group to see an increase in their representation was Hispanic teachers. Table 1 provides a more detailed account of the differences in racial demographics of the teaching workforce over this time.

Table 1. *Teacher Diversity from 1987-1988 to 2011-2012 School Year*

	1987-1988 School Year	2011-2012 School Year
Black	8%	7%
Hispanic	3%	8%
Asian	1%	2%
American Indian/ Alaskan Native	1%	<1%
White	87%	82%

FACTORS IMPACTING CURRENT TEACHING WORKFORCE TRENDS

When looking at the ongoing conversation to diversify the teacher workforce, researchers and policy makers often point to the various factors that impact students of color who enter the teaching profession. While a more in-depth discussion has taken place in greater detail elsewhere (Villegas & Irvine, 2010), it is important to explore how the recruitment and retention of teachers of color and the experiences of current teachers of color impacts the current teaching shortage.

Pre-Service and In-Service Recruitment Efforts

There are several issues that contribute to the lack of teacher diversity in PreK-12 settings. This includes flawed recruitment efforts to strengthen the teacher preparation pipeline. The U.S. Department of Education (2016) found that students of color were disproportionately represented in teacher education programs compared to their representation in their overall population on college campuses. As a result, there is a small population of students of color who are majoring in education. Recently, research which explored the experiences of students of color in high school illuminates why efforts have failed. For instance, Goings and Bianco (2016) in their investigation of the factors that influence and deter 22 Black male high school students from entering the teaching profession found that Black boys did not consider teaching due to the negative experiences they had with their teachers as students. Thus, for some students of color, encountering negative experiences as a student can serve as a deterrent to considering the teaching profession. In teacher preparation programs racially and ethnically diverse teacher candidates encounter a similar hostile college environment as students in Goings and Bianco's (2016) study where they are not viewed as academicians (McGee, 2014). Moreover, teacher recruitment campaigns are halted due to barriers such as the Praxis I, which is a standardized examination focused on students' reading, mathematical and writing skills (Nettles, Scatton, Steinberg, & Tyler, 2011; Petchauer, 2012).

Fortunately, there are colleges who successfully recruit diverse teacher candidates. Minority serving institutions (MSIs) which include historically Black colleges and universities (HBCUs), Hispanic serving institutions (HSIs), Tribal Colleges and Universities (TCUs), and Asian American and Native American Pacific Islander Serving Institutions (AANAPISIs) have an important role in producing diverse teachers (Gasman, Samoya, & Ginsberg, 2017, 2016; Goings et al., in press).

Gasman et al. (2017) found in their analysis of the role of MSIs in recruiting racially diverse teachers that over 33% of Black, Asian American, and American Indian/Alaskan Native educators receive their education degrees from MSIs. Moreover, "HSIs alone account for 44% of all education degrees conferred to Hispanics" (Gasman et al., 2017, p. 89). Despite the impact MSIs have on educating ethnically and racially diverse teachers, there is limited research that explores the experiences of students in these institutions and how they impact their desire to enter the teaching profession.

Teacher Retention

Understanding efforts to recruit aspiring teachers into the profession is an important step to address the shortage. In addition, it is equally critical to examine the experiences of in-service teachers of color. Achinstein, Ogawa, and Sexton (2010) concluded in their review of 70 articles related to the retention of teachers of color that they have a higher attrition rate than White teachers. Additionally, the researchers suggested that because teachers of color are placed in hard to staff urban schools with limited access to supportive administrators and limited professional development opportunities they are more likely to leave.

While quantitative studies explain why teachers of color are likely to leave the profession (Ingersoll, 2001; Ingersoll, Merrill, & May, 2014), qualitative studies provide a more nuanced account to explain why they leave the profession. Bristol (2018) for instance examined the experiences of Black male teachers in Boston Public Schools and found that educators who were the only Black male teacher on staff reported a greater desire to leave in contrast to Black men who had at least one other Black male colleague. Moreover, Kohli (2016) found in her analysis of 218 narratives from teachers of color that schools served as racially hostile environments influenced retention rates. These researchers highlighted the importance of immersing teachers of color into environments where their perspectives and identity are valued.

In response to research that suggests teachers of color experience racism and stereotyping from colleagues and students and limited access to race/gender specific professional development, school districts have been intentional in developing targeted professional development to support teachers of color (Bristol, 2018). For instance, Montgomery County Public Schools (Maryland) developed the Building Our Network of Diversity (BOND) program which provides support for the recruitment, retention, and development of male educators of color that work in the school system (Hicks, 2018). Moreover, Boston Public Schools has developed a similar initiative with their Male Educators of Color Executive Coaching Program, which addresses the needs of Black, Hispanic, Asian, and Indigenous teachers. Important to the sustainability of these programs is the support from school system leadership. Thus, as we begin to think about diversifying the teacher workforce, it is critical to consider the role of school and district-based leaders in creating a diverse teacher workforce.

ROLE OF SCHOOL-BASED AND DISTRICT LEADERS IN DIVERSIFYING THE TEACHER WORKFORCE

During conversations about diversifying the teaching profession, scholars, practitioners, and policy makers often focus on the educational barriers that impede the progress of teachers of color. While those issues provide insight into the lack of racial diversity in the teaching workforce, often the role of school and district-based leaders are left out of the conversation. However, these leaders have an important role in addressing these workforce shortages.

At the school level, principals can have a direct influence on the racial diversity of their

staff. For instance, in an effort to decentralize school districts, principals increasingly have the autonomy to hire teachers that they deem are a fit for their school (Laura, 2018). School leaders that recognize that teacher diversity is important are more likely to recruit and retain teachers of color. They understand that students of all racial, ethnic, linguistic backgrounds need teachers with similar lived experiences. While hiring teachers of color is not a panacea it does send a message to the school-based staff and students that they value diversity. Moreover, hiring teachers of color signifies to the local community that the leadership team believes in creating in inclusive environment. Parents may be more likely to attend school events including parent teacher conferences, performances, and off-site trips if the staff reflects the local community. Researchers including Boykin and Noguera (2011) highlighted the role that positive student-teacher and parent-teacher relationships have on student performance. Thus, hiring teachers from diverse backgrounds could positively impact student outcomes.

At the district level superintendents have the ability to make diversifying the school district's teaching workforce a priority. Local education leaders are uniquely suited to develop data driven initiatives that mirror the BOND program in Maryland. District leaders that choose to ignore the need for teachers from multi-ethnic, racial backgrounds risk alienating internal and external stakeholders. Transformational leaders understand that diversity is a strength and can alleviate cultural misunderstandings that can create tensions between teachers and community leaders. In addition, new and veteran teachers will recognize that the district leaders are committed to addressing the teacher of color gap. This is particularly important for districts that have experienced high attrition rates and low teacher and student morale.

In addition to superintendents, human resource officers (HROs) have an important role in diversifying the teaching workforce, but often are left out of the conversation. In many school districts HROs are gatekeepers responsible for recruitment and initial interviewing of teacher candidates. D'Amico, Pawlewicz, Earley and McGeehan (2017) found in their analysis of one large school district that, Black candidates were less likely than White candidates to be hired. In addition, they found that when Black candidates were hired they were significantly more likely to be placed in schools with high concentrations of students living in poverty and in schools described as struggling. These findings allude to the role that HROs can play as they can ensure that diverse candidates are given opportunities to work in a variety of schools and not just the hard to staff schools. Given the lower numbers of teachers of color entering the profession, HROs have to be strategic to ensure they not only support the recruitment of teachers of color, but to then place them in buildings where they can flourish and will be likely to stay in their role as teachers.

RECOMMENDATIONS FOR SCHOOL AND DISTRICT-BASED LEADERS ON PLANNING FOR A DIVERSE TEACHER WORKFORCE

The lack of diversity in school districts throughout the country has reached a tipping point. Moreover, given the national attention to this issue by political pundits and philanthropic organizations, there is an opportunity to gain ground on supporting school leaders in diversifying their teacher workforce. Ten recommendations are provided for school leaders to try engaging in teacher diversity efforts.

Develop Grow Your Own Programs

As previous research suggests, recruiting students of color into the teaching workforce while they are enrolled in college is a flawed strategy. As a result, many school districts have either created internal programs or what are referred to as grow your own programs to meet their needs.

While initially these programs were operating in silos, in 2017, several of these programs collaborated and developed the Grow Your Own (GYO) Collective. The GYO Collective seeks to develop a national model to recruit and retain a diverse teacher workforce (GYO, 2017). Many of these programs developed alternative pathways for high school students among others to encourage them to teach.

One poignant example is the Pathways2Teaching (P2T) program. The P2T program provides a concurrent enrollment elective course titled "Introduction to Socially Just Education." The course is offered during the school day and is designed to encourage and support high school students of color to explore teaching as a career through a social justice and equity lens. Teaching is presented as a path to disrupt inequities within their communities (Goings, Bianco, & Brandehoff, 2018; Tandon, Bianco, & Zion, 2015). Currently in its 8th year, Pathways2Teaching was launched during the 2010-2011 academic school year and began as a pilot program consisting of one course offered at a local urban high school through a partnership between the University of Colorado Denver and a local school district. The program also provides students who participate in high school the opportunity to earn a paraeducator certification, which allows them to serve as paraeducators in schools while they complete their college degree in education.

Building Intentional Relationships with MSIs to Recruit Teachers

Considering the impact that MSIs have on diversifying the teacher workforce these institutions must be central to the efforts to recruit and retain a diverse teacher candidate pool (Gasman et al., 2017). Moreover, for school leaders there is an opportunity to foster sustainable relationships with MSIs. For instance, school systems can host MSI college fairs where students gain exposure to institutions with important support systems. As more students consider attending an MSI, school systems can develop partnerships that allow students who attend these institutions to earn a job in their respective school system upon graduating from college. Increasing the number of teachers of color in schools will require new initiatives that seek to meet the needs of students from various backgrounds.

Historically MSIs have played a critical role recruiting and nurturing students focused on closing the opportunity to learn gap. Frequently these students are civically engaged and focused on solving complex societal issues including poverty (Walker, 2015). Consequently, school districts that utilize social justice frameworks to empower students (PreK-12) may have a recruiting advantage over conservative districts. Similar to other periods in U.S. history, college students are intentionally choosing professions that allow them to positively influence community ecosystems. In contrast to other post-secondary institutions, MSIs have a long history of student activism. For this reason, school districts should carefully consider adopting more progressive teaching strategies and frameworks to strengthen the MSI teacher pipeline.

Development of Support Programs for Women Teachers of Color

As school systems have sought to diversify the teaching workforce, stakeholders have focused on the low percentage of men of color (Bristol & Goings, 2018). As a result, diversity programs support the needs of men while ignoring other subgroups. However, we argue that there is a need to support women of color. Currently, they serve an important role in public education and have unique experiences because of the role gender and race play in the United States. Ignoring their racial and gendered experiences could unintentionally increase attrition rates. Historically women have navigated workspaces that unfairly devalue their contributions. It is imperative that teachers of color have access to programs that recognize their contributions while creating places to discuss

challenges. Programs that seek to support their needs should be data driven. In addition, teachers should have the opportunity to select from an array of professional development courses that provide feedback on important issues.

Collecting Career Experience Data from Current and Former Teachers

It is important for school-based and district leaders to consider examining the experience of their current and former employees. This information can be critical in determining the factors that keep teachers in the workforce as well as understanding the reasons that some teachers choose to leave that particular school district and, in some cases, the profession entirely. From this data collection, school district leaders can then develop more targeted professional development and support structures for teachers of color. These types of initiatives not only signal for current teachers that leadership wants to support their professional growth, but it also signals to pre-service and early career educators that the particular districts seeks not only to recruit them into a job but sustain and nurture their career.

Create Positive School Conditions for Current Teachers of Color

While it is important for school and district leaders to recruit more teachers of color to their schools, first we believe in the importance of retaining the current teachers of color working in schools. Given the literature (Kohli, 2016) that suggest teachers of color are placed in hostile working environments, school principals have an opportunity to ensure teachers of color are supported and are able to work in a supportive environment. This can be accomplished by ensuing that teachers of color are not solely placed in classrooms with the most behavioral or academic challenges. Students need to see teachers of color in various classroom settings which include gifted/advanced placement classrooms. Moreover, school principals can create schooling conditions that are conducive to their success. For instance, school principals can ensure that classroom equipment such as projectors and computers along with school infrastructure equipment like air conditioners are working. While this may seem simple, research has pointed to the importance of having safe working conditions (Carver-Thomas, 2018).

Revising the Training for School Leaders Responsible for Hiring Teachers

As we push for schools to increase their teacher diversity, leaders who will be responsible for recruiting, hiring, and retaining teachers of color may also need training to ensure their hiring practices are equitable and that they create an environment that is conducive to the success of teachers of color. While this can be done at the school district level, there is an opportunity for national organizations to get more involved in this training. For instance, the American Association of School Personnel Administrators (AASPA) which serves as school district HR directors nationwide and its local state chapters could lead the efforts to train school principals on teacher diversity hiring strategies.

Implementing Strategic Hiring Timelines and Compensation Packages

Because of the lack of teachers of color in the pipeline, many school districts are competing for candidates. One strategy that could provide school districts leverage is the use of creating an earlier timeline for teacher hiring. Carver-Thomas (2018) suggested that school districts vet teacher candidates before they graduate from college in order to fast-track their hiring. This becomes important because if school districts wait until June and July to hire teachers of color they may have already taken positions at other districts who have an earlier hiring timeline. In addition to having an earlier hiring timeline school district leaders can implement new compensation programs for teacher candidates. Although many school districts are continually fighting fiscal reductions, they could

initially start with improving the compensation of teachers of color in hard to staff disciplines. The combination of strategic hiring timelines and compensation policies can provide school districts an opportunity to increase the representation of teachers of color.

Strengthening Interstate Recruitment Efforts

Although public schools (nationally) serve majority-minority populations some school districts struggle to hire teachers of color because of a limited local pool of minority candidates. As a result, they must utilize various methods to successfully recruit and retain teachers from diverse backgrounds (Sutcher, Darling-Hammong, & Carver-Thomas, 2016). This can be difficult for districts that do not offer teachers of color access to communities with individuals from similar lived backgrounds. However, recruiters can offer various incentives to out of state pre-service or in-service teachers willing to relocate. Districts should consider hiring additional staff to visit states with significant minority populations. Increasing interstate efforts could strengthen linkages with post-secondary institutions and local leaders.

Empower Teachers to Identify New Teachers

Frequently the best recruiters are current teachers. School and district leaders should consider incentivizing opportunities for current teachers of color to identify new or experienced practitioners. For example, offering bonuses would encourage educators to seek out individuals from similar ethnic and racial backgrounds to choose a new school or district. Creating leadership opportunities for educators can improve the school culture (Curtis, 2013). In addition, teachers would feel invested and provide new recruits with a support system during difficult times.

Develop Innovative Initiatives

The success of GYO and other programs highlight the importance of developing unconventional recruitment initiatives. School and district leaders should consider thinking outside of the box to create new programs that could become a template for public school leaders throughout the United States. Far too often, efforts to identify and hire teachers of color fail because leaders follow outdated programs from other states. Working collaboratively with stakeholders including parents, current teachers, administrators among other community members could lead to creating programs that meet current and future needs. For instance, school leaders could recruit community members to initially serve as paraprofessionals to gain experience while also partnering with local teacher preparation programs so those individuals can earn their teaching credential and become teachers of record.

CONCLUSION

Increasing the racial/ethnic diversity in the teacher workforce is an imperative since teachers of color promote success for all students. Currently, a need exists to increase the recruitment as well as retention efforts. Intentional recruitment of teachers of color involves promoting positive experiences of students of color as well as presenting teaching as a meaningful profession at the secondary level. Additionally, building upon the success of MSI's recruitment of teachers is essential to diversify the profession. Furthermore, school-based leaders such as principals, superintendents and HROs all have important roles in recruitment as well as retention of teachers of color. These leaders directly impact who is hired as well as having the authority to create environments that are supportive rather than hostile to teachers of color. Current programs and initiatives provide promising examples of how educational leaders can utilize their influence to recruit and retain teachers of color and create supportive and successful educational environments for teachers and students alike.

Educational leaders can build on these examples to create meaningful change in their school system to foster success for all students.

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PRINCIPAL AND PROFESSOR PERSPECTIVES ON PRINCIPAL PREPARATION, PROGRAM REDESIGN, AND EDUCATIONAL PLANNING

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ABSTRACT

The purpose of this reflective research was to highlight professor and principal perspectives on the most impactful principal preparation components. These perspectives were aligned to literature in the field and used to inform educational planning during a leadership program redesign at a small, private university in the southeastern region of the United States. Eight participants were interviewed to gain their unique perspectives of what should be included in the program redesign. Results were coded and organized into themes by participant group. The themes were then used as reflection points to inform program redesign and educational planning.

INTRODUCTION

University educational leadership programs play a critical role in preparing aspiring school leaders (Hess & Kelly, 2007; Mendels, 2016). Universities offering programs that lead to state certification in educational leadership typically align their programs to state requirements (Johnson, 2016). Each state is responsible for developing initial principal preparation standards, articulating guiding policies, and supporting the preparation needs of local school districts (Manna, 2015). In addition to different state standards, there are nearly 100,000 public schools in the United States all with different leadership needs (Snyder, 2018). Several factors including school quantity, state educational leadership certification policies, and a changing local contexts impact leadership preparation. These factors accentuate the needs for deliberate and ongoing educational planning among university faculty and district-based professionals.

Empirical research has supported several elements of effective principal preparation. Instructional leadership is an area of focus that is essential to principal preparation programs (Taylor-Backor & Gordon, 2015). Other critical areas of principal preparation include data analysis and usage, human resources, school law, budget, community relations, school culture, and effective internships (Crow & Whiteman, 2016; Davis & Darling-Hammond, 2012; Hess & Kelly, 2007; Perilla, 2014; Quin, Deris, Bishoff, & Johnson, 2015). In addition, internships or field experiences are a very common aspect of principal preparation programs nationally and internationally (Anderson & Reynolds, 2015; Campbell & Parker, 2016). In this research, we examined faculty and principal perspectives of principal preparation to inform redesign efforts in the educational leadership department at a university in the southeastern region of the United States. These perspectives were interpreted and analyzed based on existing empirical research, and allowed the researcher practitioners to reflect upon their initial thoughts for planning a program redesign.

CONCEPTUAL FRAMEWORK

This reflection research was based on several established concepts in the area of educational leadership. These concepts helped the practitioner researchers frame the study and provided critical context for an educational leadership program redesign. The conceptual framework of this research was based on chasms in leadership preparation perspectives, the need for multiple perspectives in leadership preparation, inconsistencies in beliefs of the effectiveness of university principal preparation programs, the notion that school leadership has an overall impact on school success, and andragogy.

Chasms have long existed between and among practitioner and researcher perspectives of principal preparation and professional learning (Bowers, 2017; Dimmock, 2016; Labaree, 2003; McCall, 2014). These perspective chasms exist in a variety of areas to include effective leadership practices, preparation, and important local factors (Hallinger, 2018). One way to begin to reduce these chasms is to examine different perspectives, highlight gaps, and seek ways to align and synthesize the perspectives (Coburn & Penuel, 2018). Opposing empirical and practical perspectives warrant further research in the area of planning, designing, and implementing effective leadership preparation programs.

Despite these contrasting perspectives, research suggests that collaboration and planning among colleges, local educational agencies, and state department of education is critical to the development of effective leadership preparation programs (Browne-Ferrigno, 2011; Johnson, 2016; Lazaridou, 2009). Bolden (2016) suggested that empirical and practical assumptions should be considered when designing leadership preparation curriculum. Faculty in effective educational leadership programs usually collaborate with other educational stakeholders to ensure that curriculum and learning connects theory and practice (Cosner, Tozer, Zavitovsky, & Whalen, 2015; Reames & Slear, 2018). Collaboration should be maintained among university educational leadership faculty and local school district employees (Davis & Darling-Hammond, 2012). Accordingly, this collaboration underscores the importance of ensuring that educational leadership program planning is informed through the lenses of school district leaders and university faculty.

University principal preparation program effectiveness has been highly contentious. Faculty redesigning university leadership programs should examine contrasting empirical data regarding the effectiveness of university principal preparation programs (Johnson, 2016). Some empirical research has underlined inadequacies of principal preparation programs in the United States (Farkas, Johnson, & Duffet, 2003; Hess & Kelly, 2007; Levine, 2005; Orr, 2006). Other research has highlighted effective and innovative principal preparation programs (Boyland, Lehman, and Sriver, 2015; Isik, 2003; Orpanas & Orr, 2014). This ongoing phenomenon strengthens the needs for continuous research on university principal preparation programs.

Leadership is internationally known as an element that makes a difference in schools. Research on successful schools across the globe tends to focus on school leadership (Batt, 2017). Notwithstanding different perspectives of educational leadership preparation and practice, school leadership is considered to be an important factor in school success (Barber, Whelan, & Clark, 2010; Leithwood, Louis, Anderson & Wahlstrom, 2004; Orphanos & Orr, 2014; Pina, Cabrel, & Alves, 2015). Research on principal preparation is significant due to the impact on teaching and student learning (Corcoran, 2017). Researchers sought to contribute the knowledge base on leadership preparation and program redesign through this research.

Further, because adult learners are the population for this graduate program, adult learning tenets were considered and incorporated into the redesigned program. Authentic learning principles align with adult learning principles. Adults learn best through knowledge and activities that are real-world and relevant (Knowles, 1990).

LITERATURE REVIEW

Relevant literature pertaining to some of the themes were highlighted in the review of literature, however, most of the relevant literature is embedded throughout the research.

Realistic Preparation

Many university principal programs have been criticized for being too theoretical and not practical enough to successfully prepare leadership candidates (Hess & Kelly, 2007; Levine, 2005). Graduates from university principal preparation programs must be prepared to operate in the real world and are expected to have realistic skill sets (Orr, Pecheone, Snyder, Murphy, Palanski, Beaudin, & Buttram, 2018). Principals must possess a mix of theoretical knowledge and practical skills; therefore, university preparation programs should offer curriculums in accordance with this aim (Hallinger & Bridges, 2017). Curriculums that offer these characteristics are deliberately designed and based on authentic learning (Shaked & Schechter, 2017).

Realistic principal preparation can be established through authentic learning experiences. Authentic learning "is a measure of a curriculum's relevance and appropriateness to the world that graduating students will enter" (McKenzie, Morgan, Cochrane, Watson & Roberts, 2002, p.246). Johansson (1991) posited that authentic activities have real-world relevance, are practical, integrative, and rigorous. Authentic activities require work and thinking at the highest levels of Bloom's Taxonomy. Authentic learning can be included in curriculum design through authentic activities. Instructional strategies such as problem-based learning, case studies, project-based learning, and cognitive apprenticeships comprise the anchored instruction that enables authentic activities, therefore, allowing lessons to have real-world relevance. These authentic activities lead to skills building and stickiness. Stickiness refers to the structure and manner of delivery that makes the learning resonant and memorable (Gladwell, 2002).

Practical Skills

Developing practical leadership skills is consistent with the idea of realistic principal preparation. Principals need to be prepared for the type of skills they will immediately use when they assume the role (Bowers, 2017). When leadership program graduates enter the workforce and report that their university preparation program was too theoretical and did not prepare them for the real world, they are expressing the fact that they did not acquire the practical skills that allow them to function in the field as do professionals (Lombardi, 2007). The roles and responsibilities of principals vary and as a result principal candidate must be able to transfer learned skills. Learning transfer is "the application of new learning to other situations" (Smith & Ragan, 2005, p. 347). This concept also suggests the principals must be able to think critically and contextual the skills learned in their preparation programs (Meemar, 2018).

METHODOLOGY

At the outset of this project, we developed one open-ended research question for research-ers and practitioners to solicit their perception of educational leadership program redesign:

What areas do you believe are important to educational leadership program redesign and would improve principal preparation?

This research question served as our mechanism for uncovering and exploring variations in the perspective of faculty members and principals in relation to redesign efforts. Researchers asked one primary research question, but the question inherently demanded multiple responses from participants. Participant perspectives were based on their professional knowledge, leadership preparation, perceived local needs, and existing literature in the field.

Participants

We interviewed a criterion purposive sample of eight participants (four principals and four university faculty members) using the interview questions. Each principal had at least five years, but not more than eight years of experience. In addition, each one of them graduated from the educational leadership department being redesigned. Four faculty members were from two local universities, two from each university, participated in the study. Each faculty participant was tenured and had between 5 and 8 years of experience. Both sets of participants had extensive knowledge of state certification requirements and experience collaborating with educational stakeholders within the state.

Data Collection and Analysis

Data from the recorded semi-structured participant interviews were analyzed by researcher practitioners. Interviews ranged from 15-25 minutes and all participants were asked the identical questions, but were allowed to elaborate as they deemed appropriate. Initial questions were asked to obtain participant demographic information. Some of these questions were very rudimentary such as what is your name, age, ethnicity, and current position. Other questions during this phase required a more detailed response. These included:

1) How many years have you been in education and in what roles?
2) What is your educational and leadership philosophy?
3) Describe your formal and informal leadership preparation.

Participants were asked to reflect upon their professional experiences, leadership preparation, local needs of school leaders in the region, and the empirical research they use to inform their professional practices. After allowing participants a few minutes to reflect, researcher practitioners asked the participants to consider their reflections and elaborate on the prompt:

Elaborate on the areas you think are most important to redesigning the educational leadership program and would improve principal preparation.

Transcription was obtained through an online commercial company. Participant responses were double coded for emerging themes using Nvivo. Initial coding was completed line by line and incident by incident. Related initial codes were then grouped into themes by participant group (i.e. faculty & principals).

RESULTS

The Faculty Member's Perspective

The redesign of the university's Educational Leadership program was precipitated state requirements and faculty desire to redesign the program in an effective manner. The mandated changes were intended to usher in a new era of leader preparation education, not for universities to simply rebrand or repackage what they had always done. Entering the redesign, university faculty members embraced the change and focused on missing elements of program and recommendations

from the literature on principal preparation. Further, faculty members wanted to maintain their imprint on program graduates; reconfigure the curriculum to best educate and train prospective school leaders to meet the needs of local schools; and at the same time abide by accreditation requirements. Faculty members also thought that it was important for the redesigned program to be distinctive in order to be competitive with other university programs and alternative preparation programs in the region. Individual faculty members shared many perspectives about the program redesign from their practical public school background, but four themes emerged from their responses.

Authentic learning

Faculty members strongly expressed their desire to ensure that the program redesign be replete with opportunities for authentic learning. These desires were expressed through various phrases such as, "students need to experience what principals do on a daily basis through their preparation"; "we have to ensure that our programs are designed in such a way that learner learn in realistic ways"; if we cannot prepare our students for the realistic expectations, we are not effective"; and our goal is to prepare aspiring leaders in relevant and meaningful ways". These phrases and other key word were reveled throughout the transcriptions. In addition, several key words such as "authentic", "real-world", "comparable experiences", and "contextualized learning" were identified throughout the transcription.

Skills building

Every faculty member spoke of the need to ensure that program redesign included a degree of skill building. Faculty members stated that the redesign must be aligned in such a way that students obtain the skills necessary to be successful as principals. Faculty spoke of the need for students to have a 21st century skill set marked by instructional leadership, operational leadership, budgeting, law, physical and online safety, human resources, and be able perform, delegate, and oversee all these skills.

Practical application courses

Faculty members were asked about their perspectives on practical application courses. That is course that allow student to enroll in hours working on related content at a school while being enrolled in the accompanying integrated course. There are no textbooks for practical application (PA) courses as various content from the text(s) used in the accompanying integrated course are used if needed. Faculty participants asserted that theory that is unrelated to practice is a "wasted opportunity for sticky learning". Faculty members suggested that "practical applications courses" were needed and state that these courses provide the perfect vehicle for blending theory with practice in the new curriculum. The skills development dimension of the curriculum made the theory actionable.

Faculty members believed PA courses served as mini-internships during the program because they enabled real-world activities that were job and district embedded (JADE). JADE became the acronym that the lead university faculty member used as the touchstone for learning activities in the redesigned program. JADE experiences align with the tenets of active and authentic learning that undergirded the new design. All data sets used, and issues studied in the PA courses were real-world with several school district personnel providing access to JADE opportunities. The personal involvement of school district personnel ensures that site-based learning experiences start with the first semester and continue throughout the educational leadership program.

As one participant stated, that, at face value, enrollment in PA courses is a skills building undertaking. However, in the larger context, these courses provide practice with and exposure to

leadership *thinking,* which is vital to functioning as a competent and confident professional. An emphasis on practical application alone, without attention to leadership thinking, could entrench the developing leader in current practice. This is not the aim. The aim is for the students to function as problem solvers who are forward thinking and can recognize and take advantage of opportunities for change and innovation. Leaders engage in this type of integrative thinking on a daily basis. Practicing "leadership thinking" is important education, and an important component of skills building in the redesigned preparation program.

Partnership with school districts

One tenet of the state approval guidelines required universities to collaborate with a school district when offering an educational leadership program. Requiring the collaboration was another attempt to close the theory- practice gap that exists in many educational leadership programs. Faculty believed that PA courses in the university's program serve as an ideal mechanism for substantive collaboration because the courses are flexible and customizable. An aspect of collaborative work with the school district occurred when district personnel identified topics of interest for course activities and selected pertinent data sets for program use.

Additionally, faculty members believed that collaboration was enabled when the PA courses were taught by in-service practitioners, qualified to teach at the university level as adjuncts and familiar with leading successfully in schools. The practitioners added value to the learning experience by bringing direct, current, in-field knowledge to the graduate classroom. Clinical faculty model is essential for the new program design, as current knowledge, in this age of accountability, is critical to the success of the PA courses.

Principal Perspectives

Meaningful learning

Very similar to authentic learning as identified by faculty, principals tended to focus on meaningful learning experiences as being important in university leadership redesign. Principal participants were asked to identify areas that are important to educational leadership program redesign. Principal responses seemed to focus on alignment to realistic job expectations. One principal stated that, "leadership preparation curriculum should be a strategic arrangement of the curriculum to meet the pragmatic needs of students who will be school leaders". The participant further stated that some principal preparation programs do not meet the needs of their students simply because they do not understand what the needed skills and abilities are to successfully do the job from a practitioner's standpoint. Common terminology used included "it's important that the redesign eliminate busy work and focus on realistic work. Principal participants' responses reveled meaningful learning is need, but they do not think universities can adequately prepare school leaders because the students they serve work in multiple school districts and settings, which all demand different skills sets. One participant stated that, "there is no way for a beginning preparation program to prepare you for all you have to deal with, it's impossible". This belief was further reveled when another principal stated, "I have learned way more as a principal than I learned at my university". Another respondent stated that, "the task for university principal preparation programs is to figure out how to design programs that prepare students to be effective in a lot of areas and that is going to be difficult". One participant stated: "I believe that I was unacceptably ill prepared for the role of principal by my university, specifically in the following areas dealing with difficult parents, conflict management, entrepreneurial skills, and multitasking with large volumes of information daily. In these key areas,

I had to depend on job-embedded training, my personal judgment, advice from fellow principals and organizational traditions."

Lack of principal input

Every principal participant essentially complained that principal input is not included in university curriculum planning enough to be relevant. Principal used phrases such as, "principals have no voice in what being taught"; legislators do not have a clue of what we experience on a daily basis and that leads to faulty principal preparation standards"; most professors in my university leadership program never were principals or had conversations with principals"; decisions about principal preparation are being made too far those who are actually do the job. This theme very clearly emerged from transcriptions from principal participants.

No silver bullets

Principals do not believe that there is a panacea to creating effective principal preparation programs. They perceive that program redesign maybe helpful and has a "value-added component" to principal preparation but preparation courses and quasi-experimental settings   cannot replace the learning that only comes from doing the actual job and interacting with the school environment. One principal noted, "Aspiring leaders and university professors should not assume that success in coursework and internships will equate to success as a principal." The participant continues by stating that the dynamics of the role of principal are far too numerous to substantiate such a grandiose assumption and will lead to disappointment.

DISCUSSION

Several of the themes that emerged from this research were aligned by participant groups (faculty & principals) and consistent with existing empirical research on leadership preparation. University faculty suggested that authentic learning and skills building are important to program redesign and improving principal preparation. These concepts are closely related to the meaningful learning theme that emerged from principals. The explicit underpinning of these concepts is that principals need to be prepared in ways that offer relevant experiences commensurate to their roles as principals (Geer, Anast-May, & Gurley, 2014; Glathorn, Jailall, & Jailall, 2016; Haller, Hunt, Pacha, & Fazekas, 2016; Kearney & Valadez, 2015).

Faculty members recommended practical application course content that blends theory and practice. Empirical data strongly support this concept from multiple from perspectives (Deschaine & Jankens, 2017; Halinger & Bridges, 2017; Kearney & Valadez, 2015; Levine, 2005). Support for this concept is revealed in critical seminal research (Hess & Kelly, 2007) and in more novel research on the concept (Ni, Hollingworth, & Rorrer, 2017).

The results of this research reveal faculty and principal perspectives aligned on the concept of school and university partnerships. Faculty members specifically recommended leveraging school and university partnerships as a tool to improve tool. Principals stated that there should be more input from current principals into university principal preparation curriculum (Harris & DeFlaminis, 2016). These parallel perspectives strongly indicate a need for school district and university partnerships and collaboration and is heavily supported in research (Browne-Ferrigno, 2011; Cosner, Tozer, Zavitkovsky, & Whalen, 2015; Herman et al., 2017; Orphanos & Orr, 2014; Orr, 2006).

Principals believe that there is no silver bullet for educational leadership redesign components or implementing improvement to principal preparation. This term has been used ad nauseam

in education. It makes sense from a practical standpoint. In addition to the pragmatism of this concept, it is supported by researchers and practitioners in the field of principal preparation and development (Bell & Taylor, 2015; Reed & Swaminathan, 2016; Russell & Sabina, 2014; Tandberg, Hillman, & Barakat, 2014).

IMPLICATIONS FOR EDUCATIONAL PLANNING/REDESIGN

Reflecting upon data collected and analyzed during this study and research on best practices in leadership development, we made several recommendations for university faculty who are planning leadership program redesign. These recommendations represent a collective reflection of faculty and principal perspectives.

Recommendation #1

University Educational Leadership faculty should implement some form of authentic learning to bridge the theory to-practice gap in traditional courses. This authentic learning should be informed by local needs and context. The content should allow students an opportunity to encounter in the real world school leadership experiences in the context as they occur on a daily basis. Authentic learning experiences will provide opportunities for the educational leadership students to be exposed to the types of leadership activities that school leaders engage in daily. This level of exposure can lead to meaningful skills building

Recommendation #2

Collaboration among stakeholders is crucial to optimizing preparation of leader candidates. School district administrators should embrace the concepts of aligning program objectives to the needs of local school districts and globally accepted leadership development standards and practices. This may be accomplished through detailed analysis and standard crosswalks. Additionally, university faculty should engage school district leaders in collaborative research topics to align curriculum. University curriculum should be based on the realities of school leadership and based on local district needs, while being transferable to different educational settings.

Recommendation #3

Educational Leadership faculty should evaluate programs as appropriate to that students are adequately prepared with common leadership skills such as team building, networking, maximizing school resources, interpersonal skills, budgets, data analytics, critical conversations, motivating and leading groups and teams, and active coaching/mentoring. More importantly, preparing students to think critically and be able to analyze and synthesize large amounts of skill sets and information to identify and take leadership of the correct elements for school success.

Recommendation #4

When applicable, university faculty should explore opportunities for symbiotic relationships with school districts by allowing district professionals to participate in leadership preparation. This relationship may be realized by school-based professionals serving in various roles in leadership preparation programs. These roles may include guest lecturer/speaker, panelist for leadership summits and seminars, subject and content reviewers, and other areas deemed appropriate by both entities. The important factor is that the relationship be mutually beneficial to university faculty and school-district professionals. Faculty research and curriculum should be informed by realistic practices and professional experience. Accordingly, school-based practices should be informed by empirical research conducted by faculty. Another component of this recommendation involves hiring adjuncts and clinical faculty members who are currently employed by local school districts. This

recommendation is appropriate when school district professionals possess adequate state and university credentials to teach in leadership preparation programs. In addition, to maximize effectiveness of this practice, we recommend explicit calibration of content and andragogy among university faculty and school professionals who serve in these roles. These relationships are demonstrative of effective school district and university collaboration, which we believe is essential to university-based leadership preparation.

Recommendation #5

A valuable addition to the process of educational leadership program evaluation should include input from local practitioners. This input is valuable because it helps university curriculum remain relevant and help university faculty identify programmatic gaps and provided a pathway for meaningful improvements.

FURTHER RESEARCH

On-going exploration into different planning aspects of educational leadership program curricula must be paramount to university faculty. The present undertaking addressed macro-level aspects of a redesigned program (design, delivery, and faculty). Further exploration that centers on the examination of micro-level aspects of programs (specific content of courses, formative and summative assessments, and effective use of instructional strategies) is also worthwhile and will inform the continuous improvement process of educational leadership programs in a tangible and actionable way.

CONCLUSION

When redesigning leadership programs and/or planning educational changes that impact principal preparation, it is important for university faculty members to gather the perspective of local practitioners. Practitioners are uniquely poised to provide perspectives that are current, relevant, and informed by real-world practice; their perspectives are vital to program improvement efforts. Further, authentic learning is the ideal vehicle to bridge the theory to practice gap that exists in principal preparation programs.

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INTERNATIONAL STUDENTS OF HIGHER EDUCATION IN THE UNITED STATES: A GIS STUDY OF THEIR ORIGINATION AND LOCATION

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ABSTRACT

This study investigated the places of origin of international students and their distribution in the United States higher education. The data concerning the population of international students were obtained from the official website of International Institution of Education (IIE), and transferred into three maps using geographic information systems (GIS) software so that a more direct view of the data was available. The results of the study showed that 1) A larger proportion of international students come from Asian countries; 2) California, New York, and Texas are the top three states hosting international students; 3) most of the universities enrolling international students are located in the eastern part of the country; and 4) the states with already large international student populations experienced a faster growth in the population of international students over the past five years. Some implications for policy planning are discussed at the end of this paper.

INTRODUCTION

The internationalization of higher education is a common phenomenon nowadays around the world. Nearly all the capable universities and institutions are actively involved in the trend, promoting the communications among the countries and bringing significant revenues in support of the universities as well. Internationalization of higher education has positive impacts on a country's policy making (Lau & Lin, 2017; Viczko & Tascón, 2016; Wadhwa & Jha, 2014) and institutional reform (Wadhwa, 2016). Moreover, it is also a manifestation of a country's soft power capabilities (Popa, 2014).

Of all the aspects covered on the topic of higher education internationalization, the origin and distribution of international students in a country and the fluctuation of their number are worth exploring. For policy makers, the availability of the above information enables a better understanding of the current situation, based on which they can implement corresponding policies to meet the needs of business and industry in the near future.

As the most successful country with industrialized higher education, the United States is always the ideal destination for international students. In 2016, there were 1,043,839 international students studying in America, a 7.1% increase over the previous year (Institute of International Education, 2016). International students have become bridges of culture and knowledge between the United States and other countries. At the same time, they also bring in a significant amount of revenue every year through their tuition and local expenditures, helping to boost the development of U.S. economy.

This paper examines the origin and distribution of international students in THE United States, as well as the changes of student numbers in the past five years. With the support of the Geographic Information Systems (GIS), maps can be generated to visualize the information and distribution of international students studying in the United States so that we can have a clearer view of where they are.

LITERATURE REVIEW

Most of the existing literature concerning international students focuses on their acculturation and adaptation to the new environment. When international students have opportunities for social interaction and self-expression, they are more likely to adjust to another culture with the support of place attachments (Terrazas-Carrillo, Hong, & Pace, 2014). Not only individual factors such as language fluency and coping ability affect the international students' lived experiences and perceived satisfaction level of their study in the United States, but environmental factors such as the culture and reception of the host society also shape the experiences of international students (Leong, 2015).

Some existing literature elucidates on the mobility of international students. Bessey (2012) found that when making decisions on which country to go to, international students always tend to choose the countries nearer to their original countries. Similarly, González, Mesanza, and Mariel (2011) juxtaposed several elements that have impacts on international students' choice of destination, such as country size, cost of living, distance, educational background, university quality, the host country language and climate. Since the mobility of international students can bring great benefits such as financial income and constantly emerging talents to a country or region, governments of many countries either introduce preferential policies to encourage international students to study in their countries (Kayani, Ahmed, & Shah, 2015), or leverage public and private interests in the mobility of international students (Oleksiyenko, Cheng, & Yip, 2013).

Still other literature elaborates on international students' mobility choice after graduation. McGill (2013) discovered that scholarship aid, optional practical training, and temporary work visa applications were significantly correlated to a graduate's choice of residence on whether to stay in the U.S. or not after graduation. Further, Han, Stocking, Gebbie, and Appelbaum (2015) stated that the increasing global competitiveness in STEM (Science, Technology, Engineering, and Mathematics) education and the complex, restrictive nature of U.S. immigration policies are driving the international STEM students out of America.

RATIONALE OF THE STUDY

Despite the abundant literature on international students' mobility, the distribution of international student in the United States is not explored. However, some agencies (e.g., International Education) are doing research in this field and publish reports as open data on the origin and distribution of international students in the United States every year. Their data are mostly displayed in tables. With these open data available, we can visualize the data and produce several maps that display the origin and distribution of international students in the United States, as well as the fluctuation of student numbers within the last five years. The Geographic Information System (GIS) is employed as the research tool in this study.

GIS refers to the use of information technology and data to input, structure, manipulate, integrate, analyze, and display information with a geospatial aspect (Sandra, 2001). According to Goodchild (2010), geographic information science is the science underlying geographic concepts, applications, and systems. It includes a group of technologies, processes, and methods. Nowadays, it is widely applied in various fields such as engineering, planning, management, transport, logistics, insurance, telecommunications, and business (Maliene, Grigonis, Palevičius, & Griffiths, 2011). With the support of GIS software, people can transform the traditional spatial data displayed in tables into maps with dots, lines, and different layers, making it more straightforward for readers to

understand the content. The application of GIS in education research is still relatively new compared to applications in other fields. Some professional training programs are found to effectively facilitate K-12 teachers to apply GIS technologies in their daily teaching (Hong, 2017; Moore, Haviland, Moore, & Tran, 2016). In addition, Web-based GIS supports students' special thinking in a world geography course (Jo, Hong, & Verma, 2016).

PURPOSE OF THE STUDY

The current study utilizes GIS to produce maps about the origin and distribution of international students in the United States, and the fluctuation of the population of international students in the past five years. The current data relative to the above information are mainly displayed in tables or charts. In spite of the accuracy of the data, users of the data will have a clearer view when they can observe, for example, the distribution of international students in each state by a glimpse of the maps with dots representing student distribution. Therefore, it is worthwhile to apply GIS technology in this study, which will provide experiences for future researches in the same field.

RESEARCH QUESTIONS

The following four questions guided the research: (1) what are the top twenty-five countries or regions sending international students to the United States higher education? (2) What is the distribution of international students in each U.S. state? (3) What are the international students' top five destinations of United States universities in each state? (4) What are the changes of the number of international students in the past five years across states?

METHODOLOGY

Input of the Study

This study collected data from the official website of the Institute of International Education (https://www.iie.org/) that contain information answering the above four questions. Since all the data were publicly available, no IRB approval was needed.

Output of the Study

The output of the study included three maps addressing the last three research questions. The data concerning the first research question were presented in a table[1]. Map 1 described the distribution of international students in each state, with bar graphs comparing the population of international students. Map 2 showed the top five destinations of United States higher education institutions by state using dots to denote each of them. Map 3 displayed the changes in the number of international students in the past five years across states. Bar graphs were used to show the fluctuation of the population of international students.

The Design of the GIS Model

The design of the GIS model is illustrated by the following figure:
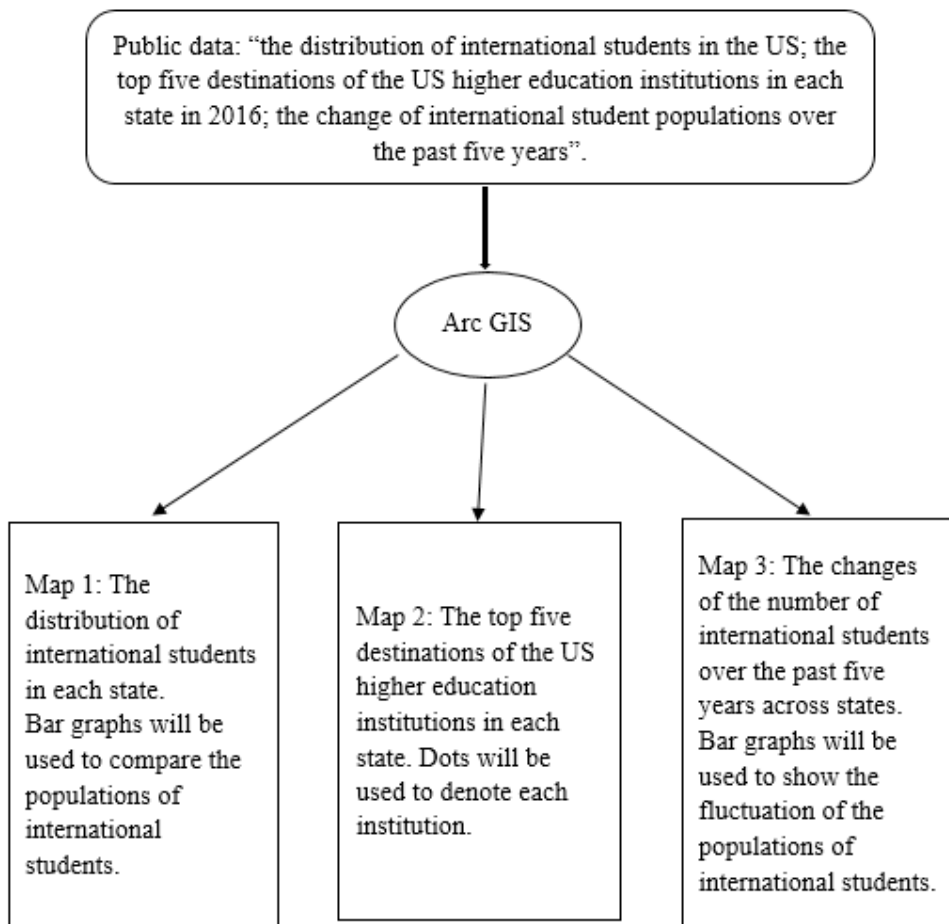
Figure 1. GIS Flowchart: Data Input into ArcGIS and Subsequent Maps

Data collection and organization

The data used in this paper were shapefiles and international students' population. The world and U.S. state shapefiles were all downloaded from the public website http://www.naturale-arthdata.com/downloads/10m-cultural-vectors. The data concerning international students' population were collected from the official website of the Institute of International Education (https://www.iie.org/), and they were reorganized into four excel files to be adaptable to each of the four maps in the following ways.

The international students' populations from the top twenty-five countries were collected. In the Excel file, the first column was country name and the second the population of international students in 2016. The international students' populations in each U.S. state were collected for the first map. The first column in the Excel file was the state name and the second the population of international students in 2016. The third Excel file was the geographical location of the universities that ranked the top five in accepting international students in each state. With the support of the

website http://www.gps-coordinates.net/, the exact longitude and latitude of each higher education institution were obtained. In the Excel file, the first column was the name of each institution, and the second and third column the longitude and latitude of the institution. The fourth Excel file included the name of each U.S state and the population of international students within the latest five years. The first column of the file was the name of each state and the rest are columns of the populations by each year respectively. All the data were organized in such ways that they could be compatible to the arc GIS software and joined to the attribute tables of each map directly.

RESULTS

The output of the study was presented in four maps, each addressing one of the four research questions. To make an accurate description of the population of international students, tables and graphs were utilized to facilitate the demonstration of the figures.

The distribution of the top twenty-five places of origin of international students

The top twenty-five places of origin of international students in 2016 were displayed in Table 1.

Table 1
Top Twenty-five Places of Origin of International Students in 2016

Rank	Place of Origin	Student Population	% of Total	Rank	Place of Origin	Student Population	% of Total
1	China	328,547	31.5	14	Nigeria	10,674	1.0
2	India	165,918	15.9	15	Germany	10,145	1.0
3	Saudi Arabia	61,287	5.9	16	Kuwait	9,772	0.9
4	South Korea	61,007	5.8	17	Nepal	9,662	0.9
5	Canada	26,973	2.6	18	France	8,764	0.8
6	Vietnam	21,403	2.1	19	Indonesia	8,727	0.8
7	Taiwan	21,127	2.0	20	Venezuela	8,267	0.8
8	Brazil	23,675	1.9	21	Hong Kong	7,923	0.8
9	Japan	19,370	1.8	22	Malaysia	7,834	0.8
10	Mexico	16,733	1.6	23	Colombia	7,815	0.7
11	Iran	12,269	1.2	24	Thailand	7,113	0.7
12	United Kingdom	11,599	1.1	25	Spain	6,640	0.6
13	Turkey	10,691	1.0				

Note: Adapted from Institute of International Education. (2016a)

It is clear from Table 1 that China and India together sent more students to U.S. universities than did the total of the other twenty-three countries. Although Saudi Arabia and South Korea ranked the third and fourth on the list, international students from each country counted for only about 6% of the total population. From the fifth country, Canada, to the last on the list, Spain, the number of international students decreased gradually from 26,973, to 6,640, and the percentage dropped from 2.6% to 0.6%.

Table 1 provided answers to the first research question: what are the top twenty-five countries sending international students to U.S. higher education? China and India, undoubtedly, sent more international students than did other countries. If we viewed this issue from a continental point of view, Asian countries or regions made huge contribution to the total population of international students in the U.S. higher education system. Of all the top twenty-five countries and regions, four-

teen were from Asia, five countries were from Europe, three countries were from South America and only two countries were from North America.

The distribution of international students in each state of the United States

After finding out where international students are from, the next question was to identify where these students went. Figure 2 illustrates the data.
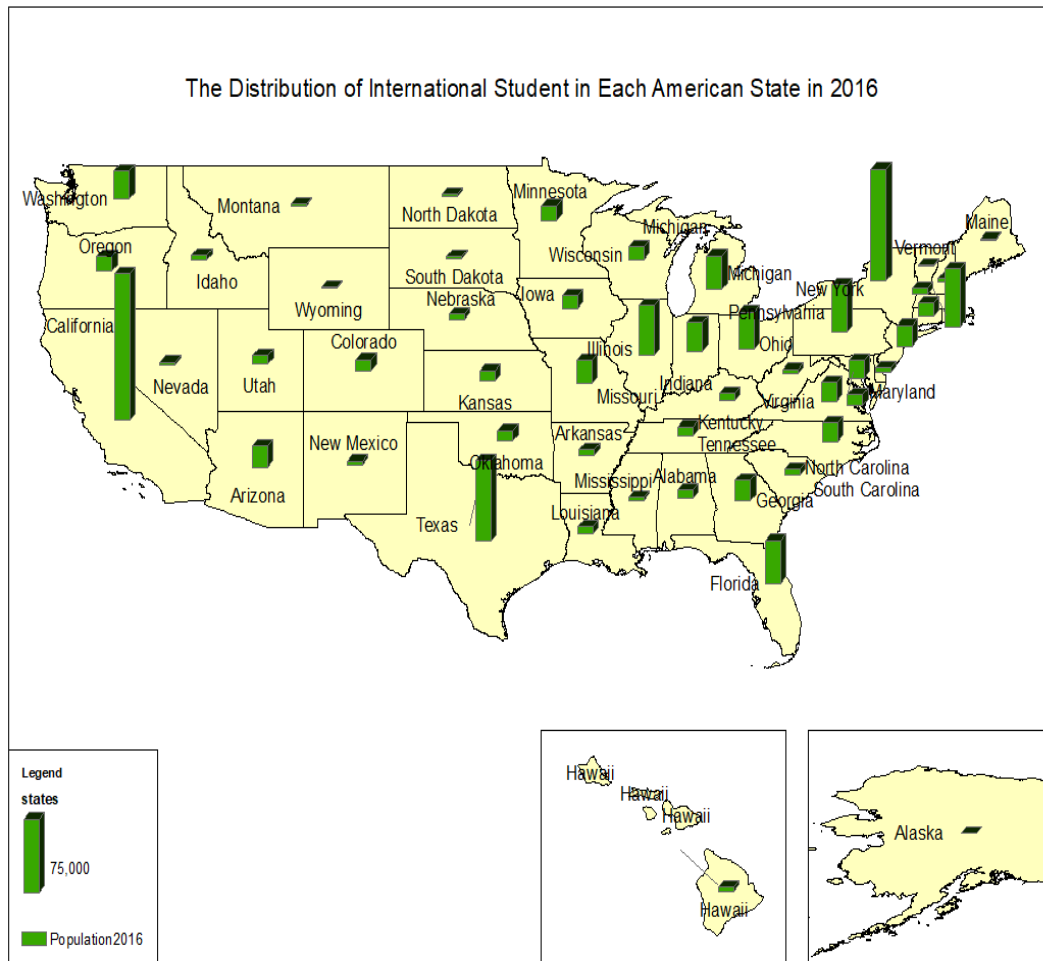
Figure 2. The Distribution of International Student in Each U.S. State

The above map demonstrated the distribution of international students in each U.S. state. Obviously, California, New York, and Texas were the top three states that accepted international students. Roughly, states that resided in the Northeast of the country host a majority of international students. Except for California and Texas, the population of international students in the Southern, Western, and Midwestern states was much smaller than that of the Northeastern states. The following Table 2 gave a detailed description of the population of international students in each state.

The distribution of international students in fifty states and Washington DC were included in this table. California, New York, and Texas had a much larger population of international students than did other states, with each hosting 149,328, 114,316, and 82,184 international students, respectively. The mean of the population is 20,452, and only the first fifteen states had larger population of international students than this number. The population of international student in twenty-two states was between 10,000 and 50,000; twenty-four states host less than 10,000 international students.

In addition to the original populations of international students in each state, it is worthwhile to investigate the proportion of international students' populations to the state populations. This enables us to have a better understanding of the distribution of international students. The current population in each state was obtained from the website: http://www.ipl.org/div/stateknow/popchart.html#statesbypop (IPL2, 2018, June 3). The proportion of international student population to state population ranges from 0.07% (Alaska) to 1.85% (Washington DC). The proportion in most states (37 states) ranges from 0.2% to 0.6%, and thus it seems that there is no obvious difference in the proportion of international student population to state population in each state.

Table 2
The Distribution of International Students in Each American State in 2016

State	ISP*	ISP/SP*	State	ISP	ISP/SP
California	149,328	0.40%	Oklahoma	10,330	0.28%
New York	114,316	0.59%	Tennessee	9,094	0.14%
Texas	82,184	0.33%	Alabama	8,561	0.18%
Massachusetts	59,436	0.91%	Utah	8,302	0.30%
Illinois	50,327	0.39%	Kentucky	8,043	0.19%
Pennsylvania	48,453	0.38%	Louisiana	7,835	0.17%
Florida	43,462	0.23%	South Carolina	6,253	0.14%
Ohio	37,752	0.33%	Nebraska	5,910	0.32%
Michigan	33,848	0.34%	Arkansas	5,665	0.19%
Indiana	29,219	0.45%	Rhode Island	5,409	0.51%
Washington	28,624	0.43%	Delaware	5,052	0.56%
Missouri	24,171	0.40%	New Hampshire	4,506	0.34%
Arizona	22,212	0.35%	Idaho	4,501	0.34%
New Jersey	21,228	0.24%	Hawaii	4,295	0.32%
Georgia	21,122	0.22%	West Virginia	4,150	0.22%
Virginia	19,549	0.24%	New Mexico	3,767	0.18%
North Carolina	18,884	0.20%	Mississippi	3,533	0.12%
Maryland	18,304	0.32%	North Dakota	2,571	0.38%
Minnesota	14,941	0.28%	Nevada	2,518	0.09%
Oregon	14,382	0.38%	South Dakota	1,981	0.24%
Connecticut	13,564	0.38%	Montana	1,735	0.18%

Wisconsin	13,449	0.24%	Vermont	1,712	0.27%
Iowa	12,711	0.42%	Maine	1,396	0.11%
Colorado	11,346	0.23%	Wyoming	1,157	0.21%
Washington DC	11,120	1.85%	Alaska	488	0.07%
Kansas	10,351	0.36%			

Note: Adapted from Institute of International Education. (2016b)
ISP: International student population
SP: State population
ISP/SP: The proportion of international student population to state population

Top five universities enrolling international students in each U.S. state

The next map, Figure 3, denotes the exact location of the top five universities that hosted most international students in each state. There should have been 255 universities on the map since fifty-one states and one district were involved (fifty states and Washington DC). However, Alaska had only four universities on the list and Delaware only two. Thus, the locations of 251 universities are mapped. The longitude and latitude of each institution were obtained from the website http://www.gps-coordinates.net/.

Each blue dot on the map denoted one institution. The density of dots on the eastern part of the continent was larger than that on the western part. If we treat North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas as the separation line between the east and the west, the comparison is more obvious. On the east coast, the dots cover the land from Maine all the way down to Florida. The density of dots was extremely large in the areas from Maine to Virginia. However, on the west coast, the dots mainly located on some large cities such as Seattle, Los Angeles, San Francisco, and San Diego.

Figure 3. The Geographic Location of the Top Five Universities Enrolling International Students in Each State of America

The change of international student population within the past five years

The third map describes the changes of international student population in each state of the United States over the past five years. Five different colors represent the population from 2012 to 2016, respectively.

A general trend was that the states with already large international student populations had been continuously enrolling more international students. Take California, New York, and Texas for example. The ascending trend of the bars from left to right is obvious. Conversely, the growth of international student populations was not discernible in some states such as North Dakota, Hawaii, Maine, and Wyoming, where relatively small international student populations existed. The following Table 3 included data from the five states that had a rapid increase in international student population and the five states that had slow increase or even decrease in international student population, which made a clearer demonstration of the trends mentioned above.
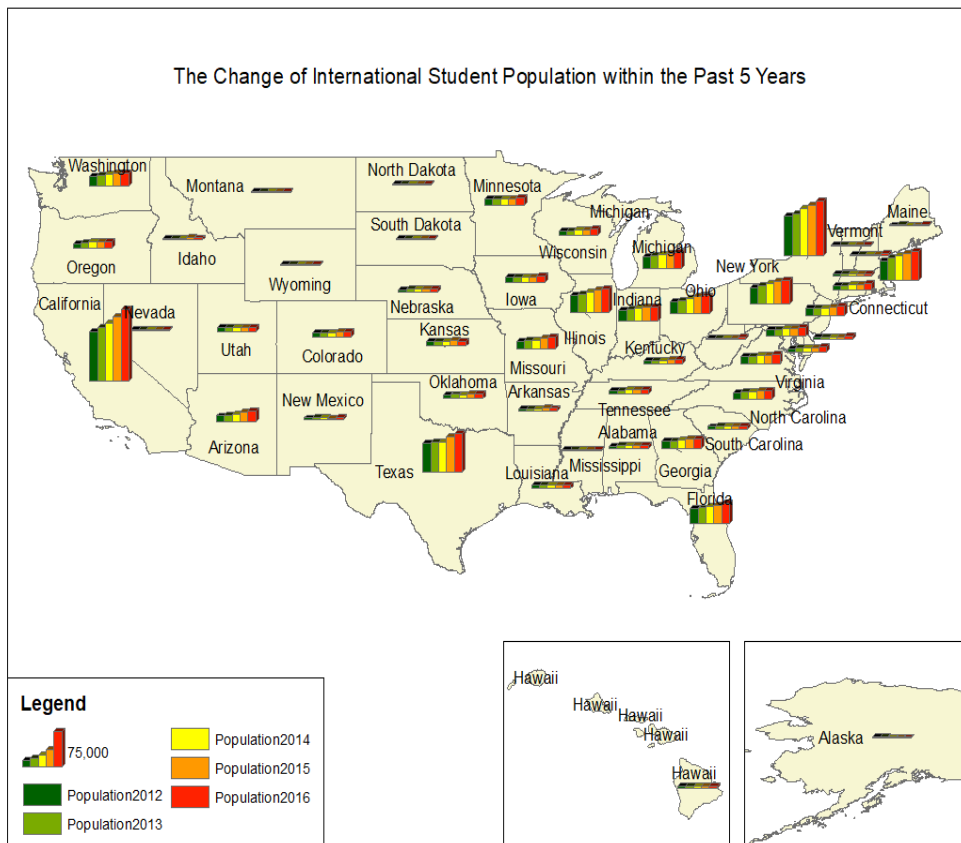
Figure 4. The Change of International Student Population within the Past Five Years

Table 3. *The Change of International Student Population in Ten American States within the Past Five Years*

States	2012 International Student Population	2013 International Student Population	2014 International Student Population	2015 International Student Population	2016 International Student Population
California	102,789	111,379	121,647	135,130	149,328
New York	82,436	88,250	98,906	106,758	114,316
Texas	61,511	62,923	64,277	75,588	82,184
Massachusetts	41,258	46,486	51,240	55,447	59,436
Illinois	35,920	39,132	42,527	46,574	50,327
Hawaii	4,446	4,450	4,388	4,035	4,295
North Dakota	3,182	3,087	2,773	2,677	2,571
Maine	1,250	1,415	1,198	1,354	1,396
Wyoming	1,072	1,097	1,124	1,174	1,157
Alaska	603	603	542	533	488

Note: Adapted from Institute of International Education. (2016b)

Figures 5 and 6 described the two different trends in international student population change. In Figure 5, all the five lines, which represented the five states, went upward from left to right. In Figure 6, the five lines either remained horizontal from left to right or went downward.
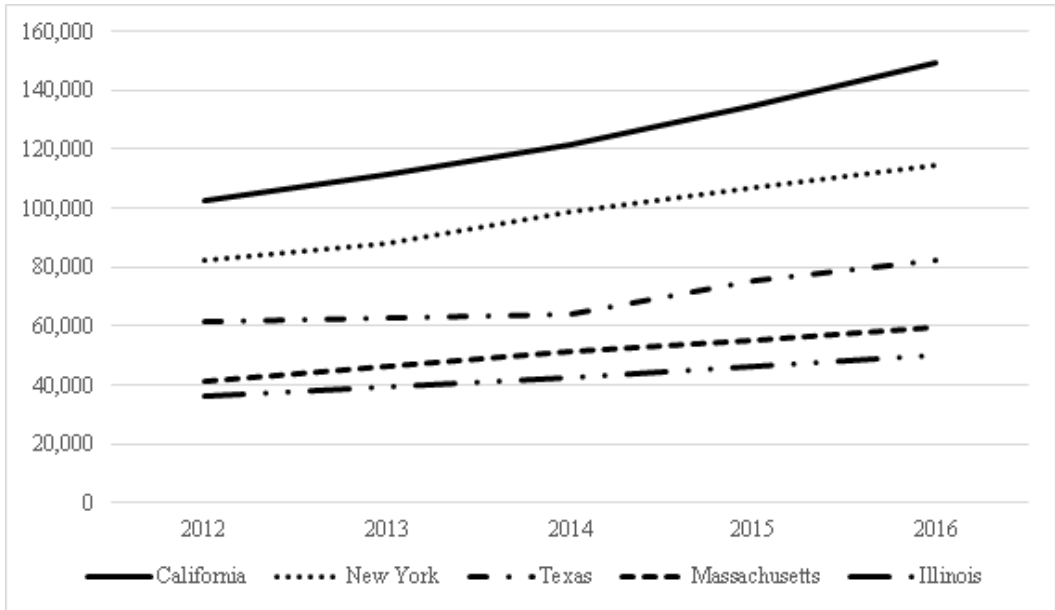

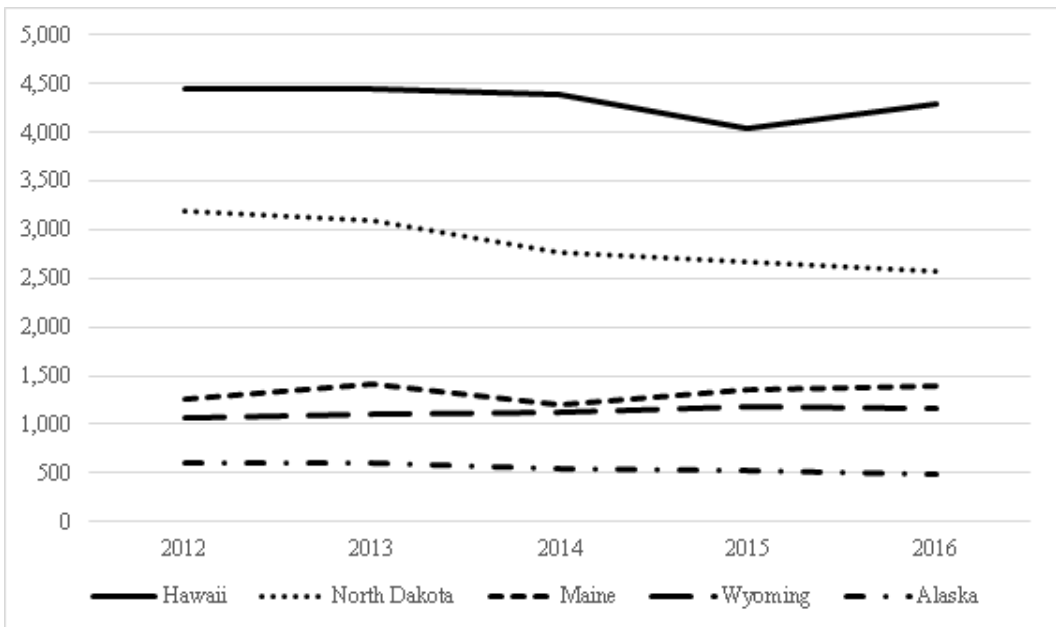*Figure 5.* Five American States with Obvious International Student Population Growth

Figure 6. Five American States with Slow or Negative International Student Population Growth

DISCUSSION

The results of the study are clearly demonstrated by the maps and tables. Table 1 showed that international students mainly came from Asian countries. Map 1 and 2 (Figure 2 and 3) showed that eastern states roughly hosted more international students than did western states. Map 3 (Figure 4) demonstrated that the states with already large international student populations experienced fast growth of the population of international students within the past five years. The reasons and impacts of the above phenomena were addressed as follows.

As to the first phenomenon, when compared to European countries that had sophisticated higher education systems, most Asian countries were still developing nations that were left behind in the construction of their higher education systems. Thanks to the advancement of technology and the development of globalization, Asian countries had witnessed fast economic growth in the past fifteen to twenty years. Therefore, students in these countries had the necessary requirements as well as the incentives to pursue better higher education in the United States, either through government or private funding. Moreover, given the large population base of Asia, it is not surprising that Asian countries sent the most international students to the United States. China and India, which ranked first and second, respectively, on the world population list, also took the first and second positions on the international student population list.

The second and third phenomena could be attributed to the following two reasons: 1) climate and geographic location, and 2) the population of immigrants. The top three states that hosted most international students were California, New York, and Texas. These three states were all located in coastal areas with comfortable climates. In addition, there were large cities in these states such as Los Angeles and San Francisco in California, New York City in New York state, and Huston in Texas, which provided not only more career opportunities but entertainments as well. Therefore, it was normal that these places were more attractive than other states for international students. Conversely, some states were either located in remote areas (e.g., Alaska) or less populated inner land (e.g., North Dakota); therefore, less international students went to these states. The other reason that accounted for the unbalanced international student population among different states was the population of immigrants. It was not uncommon for international students to cluster in the places where there were many immigrants from their own countries when choosing destinations to pursue higher education. This facilitated international students in the process of adapting to the new environment and provided them with a cultural atmosphere that was similar to that of their own countries. A significant correlation was found to exist between the population of immigrants and international students in each state.

The data of the population of immigrants in each state for 2015 was found on the website http://www.migrationpolicy.org/. Since the data did not meet the assumption of normality, the Spearman coefficient rather than the Pearson coefficient was calculated for the population of immigrants and international students in each state for 2015. The results showed that the population of immigrants and international students were highly correlated ($r = .876$, $r^2 = .767$, $p < .01$).

Table 4.

Spearman Correlation between the Population of Immigrants and International Students in Each American State for 2015

		International Student Population for 2015	Immigrant Population for 2015
International Student Population for 2015	Spearman Correlation	1	.876**
	Sig. (2-tailed)		.000
	N	51	51
Immigrant Population for 2015	Spearman Correlation	.876**	1
	Sig. (2-tailed)	.000	
	N	51	51

Note: ** Correlation is significant at the 0.01 level (2-tailed).

IMPLICATIONS FOR EDUCATIONAL PLANNING

Based upon the results of the existing study, two implications for educational planning are proposed. First, since the coming of international students boosts local economy, it is necessary for universities or institutions in those states with small international student populations to promote the level of higher education internationalization through different methods. For example, establishing relationship with foreign institutions or setting up overseas branches is conducive to increasing exposure, which will finally lead to the increase of international student populations.

Second, considering the large group of international students coming from Asian countries, a common problem for the U.S. higher education institutions was to recognize and foster cultural diversity in higher education (Gurin, Dey, Hurtado, & Gurin, 2002; Otten, 2003; Guo & Jamal, 2007). Since the Asian culture was considerably different from the culture in the United States, Asian students might confront various challenges and experience anxieties when studying in the U.S. higher education institutions. Thus, measures and policies need to be introduced to address this issue so that Asian students could adapt quickly to the new environment and release fully their potential academic abilities.

CONCLUSION

The current study examined the origin and distribution of international students in U.S. higher education. With the publicly available data from IIE, three maps were created using Arc GIS.

For the first research question, the findings of this research identified the location of the twenty-five countries or regions and provided the percentages of international students from those countries. China, India, and Saudi Arabia ranked the top three countries on the list.

For the second research question, California, New York, and Texas were the top three states hosting international students. A majority of international students were in the northeastern part of the United States. While in the vast western United States, the population of international students was relatively small, with California and Texas being the two exceptions.

For the third research question, states in the Eastern region had obviously more higher education institutions hosting international students than did the Western states.

For the last research question, though the population of international students grew steadily in the past five years, those states with already large international student populations experienced fast growth, while the states with small international student populations had slow or even negative growth.

The first limitation of the current study was that more data concerning International students' academic levels and majors should be collected so that a more detailed description of the situation can be obtained. Moreover, the study would be more valuable if the predictions about the future distribution of international students in the United States can be made based upon the past and existing data. These two limitations can be the direction of future research. Despite the limitations, this study still provides some policy implications. On the one hand, given the large number of international students from Asia, higher education institutions should be aware of the issue that this group of students experience cultural differences in United States higher education. On the other hand, both the U.S. institutions and governments should promote the enrollment of international students to facilitate the growth of their respective states, especially those institutions and states in the western regions.

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NOTE

Originally there was a map addressing the first research question. Various colors were used to denote different countries. Since the journal is printed in black and white, this map was not printed. Readers interested in the maps in color are welcome to contact the authors.

EXAMINING METHODOLOGICAL DIFFERENCES: RESEARCH ON THE RELATIONSHIP BETWEEN SCHOOL BUILDING CONDITION AND STUDENT ACHIEVEMENT

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ABSTRACT

Research in the field of Education has produced a corpus of studies dealing with the specific relationship between school building condition and student achievement reporting positive results. Yet, studies have been completed reporting no significant difference in achievement scores from students in buildings in poor and good condition. The differences in research findings may lie in the methodology employed. The most important difference might be in how the building is assessed and the instrument utilized to make that assessment. An instrument that reports those building elements that have a direct research relationship to student performance provides better data on the actual learning condition of a school building, resulting in better findings. Further, the measurement of student achievement presents unique problems to the researchers. In some instances researchers were unable to use the mean of student scaled scores and were forced to use the percentage of students passing the examination. The percent of students is not an accurate measure of student achievement, but is often the only measure available. A few researchers have used the percentage of student attendance as a proxy for student achievement with some success.

INTRODUCTION

In the past quarter century, a considerable amount of research in the field of education has been generated dealing specifically with the relationship between school building condition and student achievement. In addition to student achievement, other variables have been utilized to find out the extent of influence the school building condition might have upon students and teachers. These variables have included student attitudes, student health, and student achievement. However, this paper deals only with the variable of student achievement.

Those individuals who are interested and involved in the instruction of students most certainly are concerned about how the physical environment can possibly influence how a student learns under varied conditions. Likewise, those individuals who are responsible for designing the physical environment in which students will study are interested in the research findings dealing with the influence the physical environment has upon students. In designing schools and classrooms, members of the design profession utilize the research findings in this area of investigation to provide the best possible learning space for students.

When research findings regarding how the physical environment influences learning are explicit and concise, it is possible for educators and design professionals to rely upon the findings with assurance, thus, permitting these professionals to create a favorable physical learning environment for students. On the other hand, when there are conflicting research findings that show no significant difference in student academic scores when they are in buildings assessed in good or poor condition, it is not easy to definitely depend upon any of the findings in this area of research.

The purpose of this manuscript is to review the differences in research methodologies in studies examining the same phenomena and to ascertain why researchers have different findings

given the same basic data and methodology in the study. For instance, some researchers examining the relationship between school building condition and student achievement have found significant differences in achievement scores of students in school buildings rated as being in good and poor condition (Bullock, 2007; Cash, 1993; Crook, 2006; Earthman, Cash & Van Berkum, 1996; Edwards, 1993; Fuselier, 2008; Geier, 2007; Hines, 1996; Jackson, 2005; Lanham, 1999; O'Sullivan, 2006; Phillips, 1997; Sheets, 2009; Taylor, 2009). The findings of these and other studies enable researchers to state that the school building condition does influence student performance. Conversely, other researchers have not found such differences (Picus, Mario, Calvo, & Glenn, 2005; Lewis, 2001; O'Neill, 2000; McGowen, 2007). Normally one might expect researchers to find different results in their research if different methodologies were utilized. Such has not been the case. Conversely, researchers in this field of inquiry have utilized the same basic methodology to complete their research.

The answer to the question of differences in research findings undoubtedly has to be in the data gathered and methodology utilized. If the premise of the study is to find out if the condition of the building influences student performance, then a measurement of both the condition of the school building and the achievement of the students in that building has to be made. Statistical analysis of the data generated by such measurements must be completed to determine if there are any significant differences. If the statistical analysis of the data produces differing results, there must be some reason for this to happen and it might well be in the source of the data utilized, the data that are gathered, and in the method of treating those data. These components of methodology can be the reason researchers have differing research findings from similar studies. In a synthesis of the effect of building condition on student academic achievement Gunter and Shao (2016) found that the measurement of the building condition, assessment instrument type, subject area measured, and grade level affected the association between the two variables. In addition, some researchers have not employed the control variables such as SES, teacher quality, student ethnicity, curricular offerings that contribute to student learning in their studies. Studies that do not control for these variables are less robust than studies that employ them. This may contribute to the differences in results when comparing the mean scores of students in schools that are rated in either poor or good condition. However, control of confounding variables in a study does not explain the main reason for differences in mean achievement scores of students in the two categories of school buildings. Control of confounding variables does influence the results of the study, but studies that do not control for confounding variables may produce the same results as one that has control. The results may be slightly different.

Still, there can be confusion and doubt about the influence the condition of a school building may have upon student health and performance when research studies report there is no difference in student scores in school buildings in good or poor condition. In a meta-analytical synthesis of research studies dealing with the relationship between school building condition and student achievement, Stewart (2014) reviewed a total of 42 studies and found only 38% of the studies (16) dealt with that relationship and reported a relationship that was significant in differences between student scores. But Stewart further reported:

> There was a positive relationship between the independent variable of building condition and the dependent variable student learning in 50% of the analyses found in the studies included in this meta-analysis. The researcher identified 16 specific analyses on the association between these two variables in the 42 studies that constituted the data set. Of these 16 analyses, eight reveal a positive relationship. Among the remaining analyses,

six (38%) revealed no relationship between building conditions while two of the analyses (12%) actually reported an inverse relationship (e.g. students in substandard buildings experienced higher achievement than students in standard or above standard buildings). It can be concluded that this meta-analysis suggest a weak association between building conditions and student learning (p. 56).

While this analysis of studies is correct, simply counting the number of studies that showed a significant relationship and comparing that number with the number of studies that did not report a significant relationship is not very precise or revealing, especially when the researcher included only an extremely limited number of studies. The number of studies that are available that actually deal with the relationship between school building conditions and student performance is far greater than the limited 42 studies in the data set Stewart included and the further limited analyses of 16 studies done in the study. A simple review of the resources of any of the four major clearinghouses on educational facilities or other reliable sources will reveal a much larger number of studies completed on this subject. Hewitt (2017) found over 103 research studies that dealt solely with the relationship between school building condition and student achievement.

There are many more studies that deal with the relationship of student achievement and other variables such as age of building, selected building elements, indoor air quality, color of classroom walls, or other such variables. Yet the 50% of studies reported by Stewart (2014) that did not reveal a significant difference in student scores causes some people to believe there might not be a significant relationship between the two variables or at very best a weak association. In essence, these studies tend to make readers believe that the physical environment may not have any influence upon student health or performance. Stating that no relationship exists between school building condition and student achievement scores, however, is basically overstating the data and is incorrect. When such studies report that there is no relationship between school building condition and student achievement, readers tend to believe what they read or at least doubt existing research that report the reverse. The studies reporting no evidence of differences in student scores are completed by very competent researchers using exactly the same methodology to obtain their findings (O'Neill, 2000; Lewis, 2001; Picus, Marion, Calvo & Glenn, 2005; McGowen, 2007). As a result, the reader finds credence in what the researcher is reporting. The Picus, et.al. study is an example of a well-executed study that did not show a significant relationship between the academic scores of students in school buildings rated as being in either good or poor condition. Yet the researchers stated no relationship exists between the two variables. Although not necessarily identified as such, it is surmised, by some researchers, that methodological differences in the studies that do not report any significant difference in student scores and those that do demonstrate a difference in student scores might be the reason for not finding any significant differences in student scores when they are enrolled in school buildings assessed as being in either good or poor condition.

QUALITY OF RESEARCH

There have been some critics who have stated that because so much of the research completed in the area of the relationship between school building condition and student achievement has been doctoral dissertations that the quality of the research is limited. The implication is that because the research is a dissertation there is some less quality to the work completed than if the study was published. This criticism is unjustified and mis-construes the meaning of acceptable research, because every doctoral dissertation is peer reviewed. Every dissertation is reviewed and approved by a panel of professors who are well versed in research procedures. This review

constitutes a peer review of the research. The resultant research is of good quality and the findings should be taken for what is reported.

Much of the dissertation research is not published for several reasons. In the first place, many of the candidates who complete the research are employed by the public schools or an organization that does not reward the employee for publishing manuscripts. There is no benefit for a public school employee to publish completed research. As a result, the research done by these students is typically not published. Lack of publication does not in any way diminish the findings of the research effort.

Major Methodological Questions

The major differences in research methodology seem to center on certain questions such as:
1. Is it possible to accurately measure the physical environment?
2. For what purposes should the physical environment be measured?
3. Who can accurately evaluate school buildings?
4. Do the student academic scores accurately measure student learning?
5. Can substitute measures of student achievement be successfully utilized?
6. What statistical process is best utilized to determine significant relationships?

It is necessary to examine these questions in a systematic order to address the concerns of the manuscript.

IS IT POSSIBLE TO ACCURATELY MEASURE THE PHYSICAL ENVIRONMENT?
School Building Assessment

The first major question in this discussion related to the ability of researchers to adequately measure the physical environment in which students learn. This deals with the instrument utilized to assess the school building. There seems to be two different ways to measure the school building. One way is to try to determine if the school building contains certain building elements that directly relate to student achievement. These building elements would be those that have previously been tested through research to directly relate to student achievement.

The second method of determining the condition of the school building is by measuring the total physical condition of the building. This would entail determining the condition of the school building but also what needs to be repaired to keep the building in good order. Thus every broken window, worn section of carpet, non-operating doors, or missing floor tile needs to be identified and listed for repair. This would be in addition to identifying building elements missing, such as lack of air-conditioning, acoustical control, and proper lighting, for example.

In a review of research, Bailey (2009) stated that researchers who utilized a building assessment instrument that was designed to evaluate those building conditions that were directly related to student achievement found higher differences in student test scores between the two groups of students than in the studies where a maintenance or engineering type of evaluative instrument was used to assess the school building condition. In many research studies the condition of a school building is determined by using an engineering or maintenance type of assessment scale. These technical or engineering evaluation tools measure all parts of the building to determine what building components or items need to be repaired to keep the building in good condition (Roberts, 2013). These instruments provide data on the condition of various parts or components of the building which in turn can be listed on a maintenance/repair schedule for remedy. A large majority

of the items needing repair or replacement identified in such instruments do not necessarily relate to student learning, at least there is no research to indicate that these items have a bearing or influence on student learning.

For example, the worn carpeting in the classroom that needs replacing does not have a direct affect upon the academic achievement of students. At least there is no research to indicate such is the case. Other maintenance items such as the broken door latch, the window that needs replacing, and the chalkboard or whiteboard that is worn or not working does not have a direct influence upon the performance of students and teachers, at least there is no research to indicate such. Yet, such items may have as equal weight in the final score for the building as control of the thermal environment in the classroom, proper lighting, or daylighting in the classroom has. But the latter building features have a corpus of research to back up the claim that these building features or elements indeed directly influence the performance of students (Earthman, 2004; Englebrecht, 2003; Green, 1974; Hygge, 2003; Lowe, 1990; Mendell & Heath, 2004; Perez, Montano, Perez, 2005; Wei, 2003; Wyon, 2000; Schneider, 2003; Vilatarsa, 2004; Winterbottom, 2009)

FOR WHAT PURPOSES SHOULD THE
PHYSICAL ENVIRONMENT BE MEASURED?

In measuring the condition of the school building when the physical condition of the building is being compared to student health and performance, there needs to be a direct tie into that relationship (Hewitt, 2017). Superfluous building maintenance needs that do not directly relate to student achievement tend to marginalize those building components that do have a direct relationship. Therefore researchers that use such maintenance instruments may not be able to find a difference in student scores because the items of comparison do not directly relate to research on student health and performance. Roberts (2013) calls such assessment instruments as engineering-based evaluation instruments. He suggested that such types of instruments, while useful for the maintenance program do not provide the necessary data needed to determine if the building condition has an influence upon student performance.

In contrast, Roberts identifies building evaluation instruments that are designed to evaluate those building components and elements that directly influence student learning as mission-based instruments (2013). He further suggests that a mission-based instrument should be employed when conducting a study on how school building conditions influence student achievement. The maintenance or engineering based instruments Roberts refers to, such as the Council of Educational Facility Planners, International (CEFPI) Guide to the Evaluation of School Buildings (CEFPI, 1998), The Effective Learning Environment Assessment, (Dorris, 2011), Total Learning Environment Assessment (TLEA) (McGowen, 2007) or the Facility Condition Index (FCI) (Roberts, 2013), are designed for purposes other than research on how the school building influences student performance and behavior and to use such instruments for research purposes is not in keeping with good research protocol, because the researcher is not measuring only those building elements directly related to student achievement, but extraneous elements not related to student achievement. The ELEA and TLEA were both developed primarily for a research study dealing with the relationship between school building condition and student achievement. These instruments, however, contained items of building assessment that are not directly related to student achievement through previous research and therefore, can be classified as maintenance type of school building assessments. The findings from the two studies using these instruments did not produce significant differences in student achievement scores.

As further evidence of the effectiveness of a research type of school building assessment instrument, Roberts (2009) measured the quality of school buildings using two different types of assessment instruments in school systems in Canada. He established the quality of teaching and learning environment scale (QTLE) based upon those factors that directly relate to the educational efficiency of school buildings. He measured school systems in Canada based upon the QTLE and then used both an engineering type and educators' research assessment instruments to measure the same buildings. He found that the engineering type of assessment instrument did not directly relate to the QTLE of a school. He further found that the measurement using an educators' research type of assessment instrument directly related to the QTLE of a school building. Roberts reasoned there is little evidence to believe that engineering type of building assessment instruments can adequately assess the educational usefulness of school buildings, especially for research purposes.

School Building Classification

Another reason for not finding a relationship between building condition and student achievement might reside in how the researchers establish the school building populations for comparison purposes. Normally the achievement test scores of students in buildings assessed as being in poor condition are compared with test scores of students in satisfactory schools to determine any significant differences between the two sets of student scores. Therefore, all of the school buildings in the population need to be assessed to determine its condition as being either good or poor. The school buildings assessed in each study normally have some sort of numerical total score assigned to each building as a result of the rating instrument. This might be a composite score of the assessment instrument or some type of summative score of the condition of the school building. The score of each building is then arrayed in some ordinal scale numbering from 0 to 100 or whatever the top number might be. The assessment rating number of each school building is normally a rank ordinal number in a scale. The building scores are the key to determining good and poor buildings for determining the two groups of schools to be used in the analysis of student scores. The researcher must then divide the schools in the list into two categories depending upon the score of the building. This determines whether the building is considered in poor or good condition. This presents a problem for the researcher as to where to draw the line between the two types of buildings. To divide the group of school buildings into to equal parts, bottom and top, might not present enough of a difference in building condition to result in significant differences in student scores. There is undoubtedly very little difference in the condition of a building that has an assessment score of 49 compared to a building that is numbered 50 on an ordinal scale.

There might, however, be a difference in the condition of buildings that are listed in the top quartile and the bottom quartile of the pool. This difference might produce more of a significant difference in student scores than if the researcher used the top one-half of all school buildings in the list and compared the student scores with the student scores in the bottom one-half of the total number of school buildings. In other words, comparing the scores of students in similar buildings might not produce the same results that comparing scores of students in school buildings that are dissimilar might produce. The gradation of the condition of the schools in the middle portion of the list of buildings might be too similar to produce fruitful results. Some researchers do not report how the school building population is divided for comparison purposes. In these cases, it is difficult to determine what the researcher was using to develop dissimilar groups of school buildings for comparison purposes. But the method of division might be an explainable reason why some researchers do not find any significant differences in student scores (Earthman, 2017).

WHO CAN ACCURATELY EVALUATE SCHOOL BUILDINGS?

Validating Building Assessments

In addition, Cash (1993) and Hines (1996) used a system of double rating of the building by the principal and the researcher. They found a very high inter-rater agreement on the assessment of the school building when utilizing the Commonwealth Assessment of Physical Environments (CAPE). This gives credence to the practice of having principals rate their buildings using the CAPE. This is especially true if the items on the assessment instrument are objective type of questions that can be answered by simple observation. Principals seem to realize the importance of those building elements or components that make a difference in student learning better than anyone else and can know if the building element or feature is present or absent   The results of studies in which a school principal has provided the assessment with an instrument that is related to research on student achievement have resulted in much more productive findings than studies where an outside evaluator or superintendent has been employed to evaluate the school buildings. Bailey (2009) reported as much in his synthesis of research studies related to building condition and student performance. (p.7)

Building Assessment Responsibility

The third methodological variation regarding school building assessment might be in the individual who assesses the school building. In some of the recent studies the researchers have used superintendents, maintenance directors, engineers, or outside consultants to evaluate a building for educational worthiness. Picus, et. al. (2005) used the superintendent of schools to determine the educational value of the school buildings in their study plus outside consultants to assess the building using maintenance needs instrument.

Some research has indicated the principal is probably the most knowledgeable person about the real condition of the building. Brannon (2000) found that the knowledge principals had about the condition of the school building far exceeded that of anyone else in the school system, including the superintendent. In Brannon's study the superintendent of schools, director of maintenance, and the principal of the individual school building all assessed the condition of the school building using the same instrument. The results of these data sources were compared with the assessment of the building by an independent educational consultant. The assessments of the principals correlated with the assessments of the independent educational consultant to a greater degree than the rest of the individuals. Principals of a school building are knowledgeable about the condition of the school building because they live with it each day.

DO THE STUDENT ACADEMIC SCORES ACCURATELY MEASURE STUDENT LEARNING?

Student Achievement Scores

The reason some of the latter research on school building condition and student performance has not been able to report a significant relationship or have found a diminished difference between student academic scores might be the use of a measure other than actual student scaled scores on a standardized test. The studies that showed the most robust difference in student achievement scores were completed in the decade 1990-2000 (Hewitt, 2017). Such studies as Edwards (1993), Cash (1993), Earthman et. al. (1996) Hines (1996),) indicated differences of student scores from 3% to over 10%. Whereas the studies, such as Lanham, (1999), O'Neill (2000), Lair (2003),

Crook, (2006), Bullock, (2006), O'Sullivan, (2006), Wilson (2008), Fuselier, 2008) completed in the next decade, after the passage of the No child Left Behind (2001) legislation indicated a smaller difference in student scores. The reason for these diminished differences in student scores may well be the result of the change in reporting student scores. Additionally, many of the tests are directly aligned to the state curriculum and the teaching/learning is more intentionally focused on the test may well influence results of comparison.

CAN SUBSTITUTE MEASURES OF STUDENT ACIEVEMENT BE SUCCESSFULLY UTILIZED?

Recently some states have used and reported the percentage of students in a class who have passed the standardized academic test rather than actual student scaled scores. The percent of students passing is a gross measure that does not accurately measure student achievement as such. Rather, it is simply a measure indicating how many students achieved a certain score on the assessment instrument. In addition, some states permit students to re-take the examination or assessment if they do not pass it on the first administration. Of course, this practice is very sound educationally, because the student is given repeated opportunities to achieve a passing score. Such practices, however, do not provide accurate data for the researcher, but on the contrary provides for contaminated data for the researcher. Some students score well above the passing mark on the assessment instrument, and other students just meet the passing mark, yet all are considered as passing the examination at the minimal passing score. These test reporting practices may be sound pedagogical practice, but do not provide the researcher with data that can be precisely compared.

Student performance is normally judged on the actual score of students on a standardized achievement test that is norm referenced (Creighton, 2007). Such scores are normally given for each sub-test of the instrument as well as a composite score for the entire instrument. As can be seen, the percent of students passing an examination does not compare in accuracy with actual student scores on a standardized test. Researchers often have to be content, however, with using the percent of students passing as a measure of achievement for the entire school because the school system may not publish any other data. Some of the research studies that have been completed in the latter part of the past decade have been required to use the percent of students passing as the measure of achievement because that is the only student achievement measure available (Bullock, 2007; Crook, 2006) Such studies have found a difference in the percent of students passing when comparing student achievement in schools assessed as being in either poor or good condition, but the differences have been more diminished than the researchers before 1997 have found. Using the percent of students passing may contribute to diminishing differences in student achievement scores and result, in some studies, to find no statistical significant difference. This could well explain the inability of the researcher to find any difference in student scores.

Can substitute measures of student achievement be successfully utilized?

WHAT STATISTICAL PROCESS IS BEST UTILIZED TO DETERMINE SIGNIFICANT RELATIONSIPS?

Statistical Procedures

For the most part all of the studies dealing with the relationship between school building condition and student achievement have used the same statistical analysis of the data. The normal process is to identify the independent variable which is the condition of the school building or the

age of the structure. Data on the condition of the school building is obtained by various means and by using various assessment instruments. All methods of obtaining school building data assess the building in some way of the other. These data usually become the independent variable (Earthman, 2017).

The dependent variable is normally data from some measure of student performance or academic outcomes. These measures vary considerably from nationally normed instruments to state normed instruments and in some cases teacher grades. These data can also be supported by using student attendance data. Duran-Nurwicki (2008) in a study comparing school building condition with student attendance and student achievement in New York City found a high correlation between the two dependent variables of student attendance and student achievement. In addition, she found that both student attendance and achievement had a significant difference between scores of students in buildings that were in good and poor condition. She stated that attendance rate could be a highly predictable substitute or surrogate for student achievement when student scores are not available. The rationale Duran-Nurwicki used was that students learn while in attendance at school and do not learn when absent. Although student attendance percentage are not the same as student scaled scores, the percentage of attendance can be used as a measure of comparison to building condition to indicate differences in attendance of students in building rated as being in either poor or good condition.

Normally, in studies dealing with the relationship between building condition and student achievement, the dependent variable of student mean scores on academic measures in the two types of buildings are compared using either a t-test of independent samples. If more than two variables are used an ANOVA is employed to determine significant differences in scores of students enrolled in good or poor school buildings. These two statistical procedures seem to be the appropriate ones to use where two or more variables are compared to one another (Roval, Baker, & Ponton, 2013). In at least one study (Lewis, 2001) the researcher used a different method of comparing scores and could not find a significant difference in student scores. To define relationships of two variables, correlation analysis or regression analysis is normally used. This type of analysis is not normally employed in studies dealing with more than two variables.

In studies dealing with the relationship between school building condition and student academic achievement that have not controlled for such confounding variables as student minority status, percent of students in poverty, quality of the teaching staff, community factors or similar variables the findings have been slightly different. The findings of studies that did not control confounding variables are not considered as robust as the findings of studies that did try to control confounding variables. Nevertheless, many of these studies found significant differences in student achievement scores.

If the preponderance of the studies dealing with the relationship between school building conditions and student achievement has used the same or similar statistical methodology to determine difference in student scores, it would seem that the statistical methodology does not contribute to differences in research findings of studies that did and did not find a significant relationship in student scores. Something other than statistical methodology would be the contributing factor. This factor could well be in the manner in which the school building is assessed and categorized

Size of Findings

Some researchers have suggested that the amount of differences in student achievement scores of students in good and poor buildings is insignificant. (Picus, et. al., 2005) The size of

findings of many researchers ranges from 3% to 17%. Even accounting for the outliers, many researchers (Bullock; 2007; Cash, 1993; Crook, 2006; Earthman, et al, 1996; Edwards, 1993; Hines, 1996; Lanham, 1999; O'Sullivan, 2006; Taylor, 2009) have found differences in student achievement scores ranging from 3% to 10%. Although these differences may seem small when compared to the overall variances by which student learn, one must realize that the school system can account for only a small percent of the variance. Berliner (2010) suggested the school can account for only about 20% of the variance in student achievement, while the parents, community, and other out of school factors account for more than 60% of the total variance (Berliner, 2010). If one accepts this ratio of variances then the 3-10% variance accounted for by the building condition seems to be much more significant than initially thought. The 20% variance that can be attributed to the school accounts for not only school buildings but also teacher quality and turnover, financial ability of the school system, availability of a constellation of school programs and services for students.

Of course, the school building condition is something school authorities are responsible for and can improve. The 60% variance attributed to the family and community is almost impossible to modify by the school organization. The school system does not have much control over the 60% variance contributed by the parents, home environment, and the community in which the student lives. When all of the school related variances in student learning are considered, perhaps 3%-10% of the student variances schools can account for seem more important.

In addition, the measures of differences in student scores that are reported in various research studies are simply a snap-shot of one year. When students spend more than one year in a school building rated as being in poor condition, the effect of the school building condition can be multiplied by every year. It is virtually impossible to measure the influence a school building in poor condition has upon students over a period of years because of the movement and maturation of students and possible changes in the building. Nevertheless, it can be assumed that the influence is cumulative.

SUMMARY

Human beings instinctively believe that the physical environment influences their behavior as well as their thinking. The physical environment of the buildings that have been constructed can especially influence the users of the building. Winston Churchill is reported to have said we shape our buildings and thereafter the buildings shape us (Churchill, June 28, 1943). That said, however, trying to measure how our buildings influence the users is very difficult. Perhaps the reason is that researchers can use only the available data on human subjects which are variable at best.

Social science research is never as precise as in the so-called hard sciences. Measuring the influence of anything on humans is definitely less precise than measuring the strength of a metal. How an individual perceives the physical environment is very individualistic and changeable in nature. Yet, respectable research has indicated the condition of a school building can influence the performance of students. Students spend a great deal of time within the school building and because of that the building can have an influence upon them. In addition, students are young and very impressionable and the influence could be more pronounced for them.

Researchers have investigated the possible relationship between school building conditions and student health and productivity for many decades. A goodly number of researchers have found evidence of a significant difference in student achievement scores between students in buildings assessed as being in good and poor condition. These researchers report that there is a 3%-10% difference in student scores in buildings in good and poor condition. That percentage may seem

small at the outset, but when compared with the variance in student learning that can be attributed to school influence, these percentages are of importance. At least these percentages represent an area in which the school authorities have control.

There are some researchers who have not been able to find any significant difference in student scores when the students are enrolled in buildings assessed in good and poor condition. This does not mean there is no relationship between school building condition and student performance. It simply means that their data did not show any significant differences in student scores, because of methodological differences. The old saying that "absence of evidence is not necessarily evidence of absence" holds true in these cases (Burl, 2007, p.194).

The obvious reason for the difference in findings may reside in how data are gathered and treated in these various research studies. It would seem that methodological variations could explain why some researchers find significant difference in student scores in good and poor buildings while other researchers do not report any significant differences. These methodological differences may be found in a variety of data gathering methods. These differences seem to be related to how a school building is assessed, who assesses the school building, how the researcher develops two pools of buildings that are in either good or poor condition, student achievement assessment, and the lack of uniformity in student assessments. These variations may not be exhaustive, but seem to explain why there are differences.

The use of engineering type instruments to assess a school building for research purposes may not be the best instrument to use. Assessment instruments where the items of the instrument are research based have produced more robust findings than the use of an engineering type instrument. The reason given is that the engineering type instrument measures many elements that are not directly related to student learning and may marginalize those items that do have a direct relationship to student learning.

The individual who does the actual assessment of a school building condition is very important for good data results. Research has indicated that the principal is the individual who has better knowledge of the educational adequacy of a building than anyone else. This has been demonstrated by research findings and high inter-rater reliability between the building assessment of the school principals and other assessors.

The division of the assessed school buildings into two groups for comparing student scores is crucial in obtaining significant differences. Research has indicated that comparisons of student scores in buildings in the top and bottom quartiles of the list of school buildings produces better results than by comparing the top and bottom half of the total school building population. There apparently is little difference in the condition of schools in the middle of the building pool.

Finally the student achievement scores used in comparing students vary considerably. Many of the state assessments are state normed and the results cannot be used effectively in a meta-analysis. Many states report only the percent of students passing as the measure of student success. This measure is very gross and does not accurately measure student achievement. Because some states report only the percent of passing students the actual achievement of individual students is marginalized and merged towards the mean. In addition, all states now use a state adopted assessment instrument and this makes it difficult for researchers to develop a regional or national school population. All of this diminishes the rigor of research studies concerning the relationship between school building condition and student achievement.

All in all, the differences in methodology utilized in the studies on the relationship between school building conditions and student achievement do produce differences in findings. It is inevitable that if a school building is assessed in a way that marginalizes the differences between those elements of the school buildings that previous research has indicated to have a direct influence upon student learning, the researcher will have difficulty in finding significant differences in student achievement scores. In all of the studies analyzed by researchers, reviewing the existing research, the methods of assessing the school building is probably the most important measure of the study that will determine the findings of the study.

There is an ethical side to the reporting of research findings that needs to be observed by all researchers. Data obtained in a research study can demonstrate that there is a difference in student test scores or the data can show no relationship. If a difference in student scores is found, this would indicate that the independent variable might have an influence upon the dependent variable. Conversely, a researcher might find no difference in student achievement scores. This does not indicate there is no difference in the student test score, simply that the set of data utilized by the researcher did not show a difference. The researcher must then state that the data did not show a difference. However, the research cannot say with any certainty that there is no difference in student scores. To state that is going beyond what the data indicates.

The preponderance of research studies on the subject of the relationship between school building condition and student achievement indicate a positive relationship (Hewitt, 2017). Students attending school in buildings that are assessed as being in poor condition do not perform as well as students in school buildings assessed as being in good condition. The amount of difference ranges from 3 percent to 10 percent. This is a very astonishingly high ratio of difference in achievement scores. Additionally, students may attend school in such school buildings over a period of years and thus the discrepancy in achievement scores could well be multiplied many times. Yet, many students attend schools that are in poor condition and that is something school authorities can correct.

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