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A Quantitative Study of International School Working Conditions and Learning Environments in Relation to Student Achievement

Melissa Allen
Lindenwood University

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by

Melissa Allen

A Dissertation submitted to the Education Faculty of Lindenwood University

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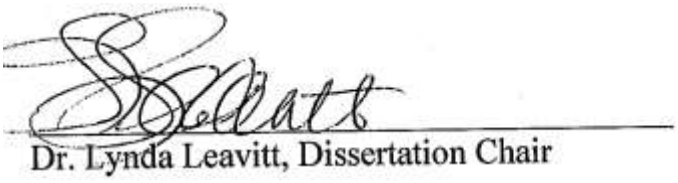

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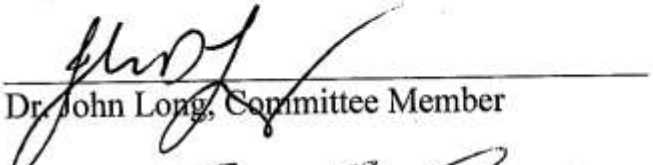

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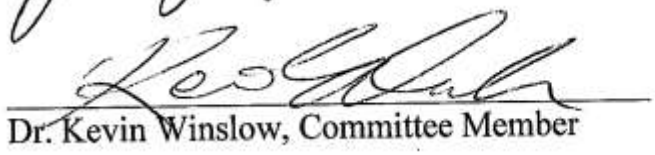

Dr. Kevin Winslow, Committee Member — 4/22/16 Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

Full Legal Name: Melissa Ann Allen

Signature:  Date: 4/22/16

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As I consider the arduous process of completing my dissertation - one fraught with frustration, anxiety, and exhaustion - I am left with an indelible impression of the tremendous support I received both professionally and personally. Dr. Leavitt, your passion for education and "thinking big" encouraged me to question the status quo and reflect upon my own beliefs in the pursuit of becoming an agent for change in the field of education. Your high expectations drove me to push myself harder than I thought I could in order to live up to your belief in my abilities. Your extensive and careful feedback elevated my dissertation and allowed me to create work in which I can take pride. Thank you for guiding me through this journey. Dr. Kevin Winslow and Dr. John Long, thank you for agreeing to serve on my committee and being willing to offer your vast expertise and perceptive feedback. Your insight was valuable in shaping my dissertation.

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Abstract

With an increased focus on global competition, many educators and policymakers relied on international assessments such as the Programme for International Student Assessment (PISA) to evaluate the ability of their education system to prepare students for the global economy. Students in the United States continued to demonstrate disappointing results on the PISA, which led to an outcry by American educators and policymakers and a call for reform. To lessen the achievement gap between the United States and other countries, experts suggested the importance of identifying the characteristics of high performing countries and adapting effective policies to fit the needs of the United States.

The current study sought to provide a research-based foundation for school reform in the United States by initially seeking relationships between research-based factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) from the Teaching and Learning International Survey (TALIS) and student achievement. Then, where relationships occurred, the researcher ascertained the extent of differences within those factors between the United States and the top five, middle five, and lowest five performing countries that participated in both the 2012 PISA and 2013 TALIS.

The analysis of the data revealed several relationships among factors of school working conditions and learning environments and student achievement. The results also indicated several differences within these factors between the United States and the selected countries. Based on these results the researcher offered several recommendations

to educators and policymakers in the United States, such as providing teachers with the time and skill to offer each other meaningful feedback, completing further research on the efficacy of utilizing student performance data in evaluation frameworks, allowing teachers more meaningful opportunities to reflect and collaborate in order to foster common beliefs about teaching and learning, and providing additional training to teachers in the United States on the appropriate and effective use of assessment strategies.

Table of Contents

List of Tables

Chapter One: Introduction

Background and Purpose of the Study

In recent years, the United States has become increasingly concerned with global competition in the workplace and our educational system. The growth of national and international tests of academic achievement led many to suggest the American school system was falling behind other countries in its ability to prepare students to perform academically (Heyneman & Lee, 2012; Kamens & McNeely, 2010). Introduced in 2000, The Programme for International Student Assessment (PISA) became a yardstick by which countries judged the worth of their education systems. The PISA was an international assessment given to 15-year-olds every three years to assess their knowledge in reading, mathematics and science (Organisation for Economic Co-operation and Development [OECD], 2014a). To the chagrin of many U.S. policymakers and educators, the PISA revealed disappointing results for students throughout the American education system. According to the Organisation for Economic Co-operation and Development (OECD, 2013a), on the 2012 PISA given in 65 economies around the world, the U.S. performed average in reading and science and below average in mathematics, with no significant changes to U.S. performance over time. At the release of the 2012 PISA results, Duncan (2013), the U.S. Secretary of Education, described the U.S. performance as a "picture of educational stagnation" and urged that this performance "must serve as a wake-up call against educational complacency and low expectations" (para. 9-10).

The lackluster performance by U.S. students on the PISA raised alarm about U.S. ability to compete globally. The gap between American students and students from

Singapore, Korea, Finland, and developed parts of China suggested an inability to compete in a world that had become increasingly connected and competitive (Friedman & Mandelbaum, 2011). To mitigate this gap, experts suggested studying the world's best education systems to redesign the American education system (Tucker, 2011). Similarly, in its report, *Strong Performers and Successful Reformers in Education: Lessons from PISA 2012 for the United States*, the OECD (2013a) stated, "By identifying the characteristics of high-performing education systems PISA allows governments and educators to identify effective policies that they can then adapt to their local contexts" (p. 12). The researcher believed, at the time of this study, that understanding the contributing factors of teaching, learning, and student achievement among high performing countries might provide valuable insight into strategies and reform agendas that could be utilized to improve the American education system.

The purpose of this study was to ascertain possible differences and relationships among research supported factors of school working conditions and learning environments contributing to international student achievement. The factors in this study were those assessed by the 2013 TALIS and included initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices. The specific focus of this research was on the U.S. and the top five performing countries (Singapore, Japan, Korea, Finland, and Poland), middle five performing countries (Czech Republic, Italy, Latvia, Portugal, and Spain), and lowest five performing countries (Romania, Bulgaria, Mexico, Brazil, and Malaysia) on the reading component of the Program for International Student Assessment (PISA) from those countries that participated in both

the 2013 TALIS and 2012 PISA. In the first stage of this study, the researcher reviewed the work of Marzano (2003, 2006, 2007) and Hattie (2009, 2012) to align TALIS components to research-based educational practices. Components of the TALIS that aligned to this educational research were selected for further analysis. The second stage of this study analyzed possible relationships between factors of school working conditions and learning environments as reported by participating principals and teachers and defined by the 2013 TALIS and student achievement on the reading component of the PISA. The third stage of this study investigated fundamental differences in working conditions and learning environments of students between the U.S. and the top five, middle five, and lowest five performing countries measured by PISA scores.

This study was designed after reading the research by Kaplan and Turner (2012) that demonstrated the importance of linking the TALIS and PISA data. This study stressed the significance of using the PISA and TALIS to understand aspects of teacher practices and classroom climate in regards to student achievement, solely in the country of Iceland (Kaplan & Turner, 2012). A gap in the literature existed in understanding the international differences in the relationship between school and teacher practices and student achievement.

In an effort to provide insight into different factors of teaching and learning (teacher feedback and appraisal, school climate, school leadership, and teachers' instructional beliefs and pedagogical practices) the OECD administered the first TALIS in 2008 (OECD, 2014h). The foundation for many of the themes found in the TALIS originated with the focus on school effectiveness factors that became prevalent in the 1970s and 1980s. One of the most widely disseminated effective school frameworks was

introduced by Edmonds (1982) and included the following characteristics: instructional leadership of the principal, a strong instructional focus, a safe school climate conducive to teaching and learning, teacher behaviors that demonstrated clear expectations, and program evaluation based on measures of student achievement. Many of these characteristics demonstrated a strong relationship with student achievement. For example, numerous studies found a direct correlation between school climate and student achievement (Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Freiberg, 1999; Good & Weinstein, 1986; Ma & Klinger, 2000; MacNeil, Prater, & Busch, 2009). Additionally, studies on professional development and leadership revealed a correlation with student achievement. In a five-year research study funded by The Wallace Foundation, leadership and professional development demonstrated a strong relationship with student achievement (Wahlstrom, Louis, Leithwood, & Anderson, 2010).

Another key aspect of Edmonds' (1982) framework was the use of teacher evaluation models based on student achievement. In the push for high-stakes standardized testing, the need for research in the area of teacher appraisal and feedback had become increasingly important. The Obama administration's Race to the Top program and the distribution of waivers fueled reform in the evaluation of teachers across the country and emphasized the use of student growth data (McGuinn, 2012; United States Department of Education [USDOE], 2012).

Policymakers believed that using student performance as a means to evaluate teachers would improve the quality of the teacher workforce and lead to the elimination of poor educators (Donaldson & Papay, 2012). However, some researchers had reservations about the use of student achievement scores as part of teacher evaluations.

Larsen (2005), Assistant Professor of Education at the University of Western Ontario, questioned the use of evaluation models that used achievement scores as a measure of proficiency. She argued that these types of accountability-based teacher evaluation models increased stress, anxiety, and fear among teachers and were often implemented at the expense of high quality teaching. Based on the opposing viewpoints on evaluation models illustrated in these examples, it was the researcher's belief that the then-current research was insufficient in providing an evaluation framework for schools in the U.S. The TALIS provided both principal-level and teacher-level information on how teachers were appraised and given feedback in a school setting and perceived outcomes related to this appraisal and feedback (OECD, 2013c). If relationships were found among methods of teacher appraisal and feedback and student achievement, the researcher believed these relationships could serve as a foundation for an evaluation framework in the U.S.

In light of the research regarding school factors and the increased focus on global competition (Friedman & Mandelbaum, 2011) it was the researcher's belief that the next step in the work of teaching and learning factors was to investigate possible relationships between teaching and learning factors and student achievement, and where relationships occurred to determine the extent of international differences among these factors between the U.S. and high, middle, and low performing countries. The researcher believed that initially seeking relationships between teaching and learning factors and student achievement and then determining if differences existed among these factors between the U.S. and other countries would enable policymakers to identify teaching and learning factors that could positively alter student learning. Additionally, the researcher expected that investigating international differences in teaching and learning factors on the TALIS

and their relation to student achievement could provide a research-based foundation for school reform.

Hypotheses

Hypotheses tested for this study were as follows:

H_1: There is a relationship between the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS and reading achievement measured by the PISA among the selected countries: United States, Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

H_2: There is a difference in the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS between the United States and the other selected countries: Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Limitations

The information obtained in this study may have been limited by the fact that the TALIS lacked a direct connection with student outcomes. Although both the TALIS and the PISA were administered by the OECD, different samples were used. As a result, the researcher was unable to pair specific student outcomes with responses from specific

teachers and principals. This study could also have been limited by the identification of top performing, middle performing, and low performing countries. Not all countries participated in the TALIS, which led to the exclusion of these countries from this study.

Another limitation of this study could result from the questions respondents were asked. Although the TALIS covered many themes, it was possible the survey did not include specific factors related to student achievement. Additionally, the TALIS was designed as a self-report survey for teachers and principals. Due to the nature of this survey, respondents could have been confused by questions or answered untruthfully.

Definition of Terms

The following terms were used continually throughout the study and warrant further explanation:

OECD: The Organisation for Economic Co-operation and Development (OECD) was founded in 1961 and composed of 34 member countries from all around the globe, including both advanced and emerging countries (OECD, 2014b). "The mission of the Organisation for Economic Co-operation and Development (OECD) is to promote policies that will improve the economic and social well-being of people around the world" (OECD, 2014b, para. 1).

PISA (2012): "The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students" (OECD, 2014a, para. 1). The tests were designed to assess students' ability to apply their knowledge in the key subjects of reading, mathematics, and science to real-life situations (OECD, 2014a).

"Around 510,000 students in 65 economies took part in PISA 2012 representing about 28 million 15-year-olds globally" (OECD, 2014h, para. 2).

School Climate: "School climate refers to the quality and character of school life. It is based on patterns of school life experiences and reflects norms, goals, values, interpersonal relationships, teaching, learning and leadership practices, and organizational structures" (National School Climate Council, 2007, p. 5). Researchers outlined the following four main areas of school climate: safety, relationships, teaching and learning, and the institutional environment (Center for Social and Emotional Education, 2010).

Student Achievement: For the purpose of this study, student achievement was defined as scores on the reading component of the 2012 PISA.

TALIS: The OECD Teaching and Learning International Survey (TALIS) was developed to answer the question, "How can countries prepare teachers to face the diverse challenges in today's schools" (OECD, 2014h, para. 1).

> TALIS asks teachers and schools about their working conditions and the learning environments. It covers important themes such as initial teacher education and professional development; what sort of appraisal and feedback teachers get; the school climate; school leadership; and teachers' instructional beliefs and pedagogical practices. (OECD, 2014h, para. 2)

"TALIS began in 2008 in 24 countries, focusing on lower secondary education. TALIS 2013 covers 33 countries and enables them to conduct the survey in their primary and upper secondary schools as well" (OECD, 2014h, para. 3).

Teacher Appraisal: Found within the TALIS teacher questionnaire, and defined as "a review of teachers' work. This appraisal can be conducted in a range of ways from a more formal approach (e.g. as part of a formal performance management system, involving set procedures and criteria) to a more informal approach (e.g. through informal discussions)" (OECD, 2013c, p. 39).

Teacher Feedback: Described in the TALIS teacher questionnaire, as

> any communication you receive about your teaching, based on some form of interaction with your work (e.g. observing as you teach students, discussing curriculum or students' results). Feedback can be provided through informal discussions with you or as part of a more formal or structured arrangement. (OECD, 2013c, p. 36)

Summary

As students in the U.S. continued to demonstrate average and less than average scores on the PISA, U.S. leaders and policymakers emphasized the weaknesses and underlying problems of the American education system and called for change. Many policymakers studied the school factors in other countries in the search for teaching and learning factors that could be transferred to the education system in the U.S. (Cavanagh, 2012). This study attempted to determine possible differences and relationships in teaching and learning factors (TALIS) that contributed to international student achievement (PISA). The results of this study could serve as research-based strategies for school reform.

Chapter Two will review the literature that initiated this study. In particular, teaching and learning factors covered in the TALIS (initial teacher education and

professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) will be explored in the context of individual countries. Reviewed countries will include the high performing countries identified in this study (Singapore, Japan, Korea, Finland, and Poland) and the U.S. Similarities and differences among different countries will be highlighted.

Chapter Two: The Literature Review

A review of the literature current at the time of this writing included school factors assessed by the TALIS in the context of high performing countries on the PISA, initial teacher education and professional development, teacher appraisal and feedback, school climate, school leadership, and teachers' instructional beliefs and pedagogical practices within the top performing countries of Singapore, Japan, Korea, Finland, and Poland as well as in the U.S. Reform efforts recent to the time of this writing, in particular countries and the commonalities and differences among countries, were also discussed.

High performing countries in this study were identified by their success on the PISA, an international indication of student achievement and level of success of their education systems when compared to other countries. Although many questioned the widespread use of the PISA's predictive ability, the PISA demonstrated a significant relationship with both educational and employment success (Cheung, & Chan, 2008; Fischbach, Keller, Preckel, & Brunner, 2013). According to Sireci (2015), Director of the Center of Educational Assessment at the University of Massachusetts, "The importance of the PISA results cannot be overestimated because they influence educational policy decisions across the globe" (p. 1). In light of the importance of PISA in policy decisions, some educators expressed the need to look past rankings and analyze the successful educational practices of other countries. In an interview with Sawchuk from *Education Week*, Weingarten, President of the American Federation of Teachers, expressed frustration with the usage of international results: "We talk about the conclusions from these international reports, but we don't dissect and deconstruct them in a way that

follows how they got to those conclusions" (Sawchuk, 2012, para. 66). Similarly, in an analysis of the international testing results on education reform in the U.S., Turgut (2013) explained that the U.S. needed to examine the teacher education programs abroad and the autonomy afforded to teachers in high-performing countries. Even the OECD (2013a), the organization which developed and administered the PISA, emphasized the importance of utilizing the PISA results to identify effective practices and policies from high-performing education systems. This literature review attempted to look past PISA rankings and examine the factors that may have contributed to high achievement.

Singapore

Singapore's scores on international assessments led to the title of "high achiever." In the reading component of the 2012 PISA, Singapore ranked third and scored significantly higher than the average, with a score of 542 compared to the OECD average of 496 (OECD, 2014c, p. 177). Various reasons were identified as the secret to Singapore's success, such as a rigorous teacher education program (Jensen, Hunter, Sonnemann, & Burns, 2012) and an emphasis on 21st century learning (Hairon & Dimmock, 2012). These components of the Singapore education system were explored in greater depth along with other school related factors.

Initial teacher education and professional development. Singapore's teacher education program was highly regarded and well-respected throughout the then-current literature (Jensen et al., 2012). To develop effective teachers with a deep commitment to professional improvement, Singapore placed an emphasis on attaining the best and brightest students by recruiting from the top third of high school graduates (Stewart, 2013). As a way to attract these graduates, Singapore enhanced the status and

compensation of teaching and paid teachers as civil servants starting with their initial teacher education (Tan, 2012). An intense application process inclusive of panel interviews, an intensive review of their academic record, and an analysis of their contributions to their school and community resulted in one out of eight applicants being admitted into the teacher education program (Center on International Education Benchmarking, 2015a).

Once students were admitted into the teacher education program, they were trained at the National Institute of Education (NIE), where educators in Singapore were exclusively trained (Tatto, 2015). The NIE aimed to prepare teachers with a strong ability to implement an inquiry-based teaching approach (Tatto, 2015). In a description of its educational model, the National Institute of Education (NIE, 2009) stated that it "provides theoretical foundation to produce the 'thinking teacher' whilst concurrently having strong partnerships with key stakeholders and the schools to ensure strong clinical practice and realities of professionalism in teacher development" (p. 2). The NIE further described its strengths as "subject matter and pedagogical content knowledge, as well as a strong connection to educational research" (2009, p. 2). The Singapore education program ensured its community that teacher candidates develop a deep understanding of their content area, while also requiring them to learn about practical teacher skills and apply these skills to their classroom (Tan, 2012).

Although Singapore's teacher preparation model generally produced well-trained teachers, Singapore decided to make changes to this model to keep up with rapid global changes. In 2009, the National Institute of Education established a new Teacher Education Model for the 21st Century (TE21) to develop teacher candidates into 21st

century teachers that nurtured the whole child and helped children cultivate 21st century skills to guarantee their success as members of the community and global economy (NIE, 2009). Changes made within this model included teacher preparation program accountability for initial teacher abilities, increased mentoring of beginning teachers, greater development of instructional practices in teacher candidates (including cooperative and inquiry-based learning), larger emphasis on the improvement of Internet and communication technology skills, increased focus on the use of data and assessment to inform instruction, required service learning to enable candidates to learn about communities, and a focus on improving research skills to aid teachers in solving problems using evidence (Stewart, 2012). To maintain a balance between theory and practice, the NIE (2009) stressed the importance of bridging the gap between theoretical knowledge and practice-based learning by enhancing teacher candidates' abilities to reflect on their practice, participate in experiential learning and school-based research and inquiry projects, and develop pedagogical tools that brought the classroom into the university.

Once teacher candidates were hired as full-time teachers, they had numerous professional development opportunities available. To allot time for teachers to participate in deep reflection and continuous improvement of their practice, they taught classes for about 20 to 25 hours per week and were given approximately 20 hours to prepare lessons, observe classrooms, work with students, or take part in professional development (Stewart, 2012). In addition to the 20 hours a week Singapore teachers had to collaborate with their colleagues and observe instructional practices in their peers' classrooms; the government paid for up to 100 hours of professional development per year for all teachers

(Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). To improve their teaching skills, teachers could take courses at the National Institute of Education or at the Teacher's Network (Center on International Education Benchmarking, 2015a). Established in 1998 by the Singapore Ministry of Education, their mission was to produce lifelong learners and reflective practitioners by utilizing learning circles, teacher-led workshops, conferences, a well-being program, a website, and publications. These components allowed teachers to engage in reflection processes, dialogue regarding educational practices, and action research in a supportive and collegiate environment (Darling-Hammond et al., 2009). The researcher believed Singapore's large investment in professional development was evidence of a commitment to facilitating long-term growth in their educators.

Teacher appraisal and feedback. In Singapore, teachers underwent yearly appraisal by educational leaders within the individual schools using a framework that relied on a wide array of measures and was designed to "create a dialogue between teachers and their supervisors that is regular, frequent, clear, and intended primarily to help teachers improve and keep up with change" (Stewart, 2012, p. 110). This framework was developed over many years with input from teachers and assessed "the role of the teacher in the academic and character development of their pupils, pedagogic initiatives, professional development, contribution to their colleagues, and their relationship to community organizations and to parents" (Asia Society, 2013, p. 14). To better individualize teachers' evaluations, teachers were appraised on specific tasks aligned to the career track they chose (teaching track, leadership track, or specialist track) (Tan, 2012). The Enhanced Performance Management System (EPMS) was used for all

educators and required the establishment of a development plan every year to identify specific areas of weakness and provide on-going performance monitoring and emphasize self-evaluation and reflection on ways to improve (Jensen et al., 2012). Instead of concentrating on meeting specific performance benchmarks, school leaders demonstrated a desire to improve teacher abilities throughout their career by utilizing formative, rather than critical and summative, feedback that focused on providing constructive criticism and specific feedback after all observations (Tan, 2012).

Singapore's evaluation model could be a time-consuming process. Teachers were supported throughout this process with their access to 100 hours of professional development and reimbursements for improving their knowledge and skills (Stewart, 2012). In addition to supporting long-term growth in teachers, this educator evaluation model promoted accountability by matching teachers to career paths and determining annual bonuses (Tan, 2012). Additionally, Singapore's dedication to professional development demonstrated an awareness that not all aspects of teaching could be measured, and they were reviewing their evaluation system to move from an emphasis on content knowledge to an emphasis on student-centered learning (Asia Society, 2013).

School climate. Like other high-performing cultures, the school climate in Singapore was focused on the idea of cultivating success through effort. Singapore classrooms were dominated by students who were intensely engaged within the classroom, and these students showed similar dedication outside the classroom by limiting their participation in activities such as dating, television, and sports (Stewart, 2012). Confucian teachings that promoted commitment and determination were ingrained

in the Singaporean culture, and it was believed that the emphasis on effort was related to these teachings (Koh, 2010).

In addition to promoting the idea that success was achieved through effort, Singapore schools often promoted the importance of community. In a research study conducted by the NIE (2013), researchers measured school culture in Singapore based on the five key dimensions of collegiality versus individuality- hierarchy, nurturing, academic emphasis, and task versus people orientation and found that Singapore schools demonstrated an emphasis on the Asian culture of collectivism despite the influence of Western culture. Similarly, in a speech in 2010, Keat, the Minister of Education in Singapore, also stressed the importance of schools, parents, and communities working together to promote "a sense of shared values and respect [that] allows us to appreciate and celebrate our diversity, so that we stay cohesive and harmonious" (para. 41). Like many Asian cultures, the emphasis on collectivism played an important role in Singaporean schools.

School leadership. An essential component of Singapore's education system was their dedication to recognizing and nurturing talent. Similarly to other high-performing countries, Singapore employed a methodical approach, modeled after successful corporations, to recognize potential within their schools and advance the careers of their teachers (Stewart, 2012). Many participating members at the 2012 International Summit of the Teaching Profession encouraged the use of a collaborative model that would afford teacher leaders the ability to rise to higher leadership roles and lead to improved instructional leadership in each school (Asia Society, 2012). In order to find leadership within their schools, Singapore used this type of collaborative model by beginning to

assess their teachers after three years of teaching to determine their potential in one of three career tracks - senior specialist track for teachers with high level education knowledge, leadership track for teachers identified as potential school leaders, and teacher track for teachers with excellent subject, instructional, and assessment knowledge (Jensen et al., 2012).

Teachers in Singapore were given multiple opportunities to demonstrate their leadership capabilities by serving on various committees, taking on leadership positions such as a head of a department, or working in the Ministry of Education (Schleicher, 2012). Proficiency in these leadership roles led to opportunities to be trained as a leader. Once potential leaders were nominated by the Ministry in discussion with schools and principals, they underwent several interviews with administrators and Ministry Officials and were required to pass a series of situational assessments before being selected for a leadership training program (Jensen et al., 2012). The Leaders in Education Program was a six month training program that focused on innovation and school transformation by focusing on knowledge content, knowledge creation, and knowledge application (Stewart, 2012). Elements of leadership, such as critical self-reflection and the integration of experiences and beliefs also played an important role in the training (Jensen et al., 2012). After the training program, Singapore continued its support of leaders by placing new leaders with mentors, placing more experienced leaders in schools based on need, and offering experienced leaders opportunities to become system-wide leaders (Schleicher, 2012).

Teachers' instructional beliefs and pedagogical practices. Singapore increasingly moved away from a system that predominantly emphasized transmitting

knowledge to a system that was focused on promoting creative thinking skills and an investment in lifelong learning (Stewart, 2012). To this end, Singapore developed the *Thinking Schools, Learning Nation* framework designed to promote 21st century learning through critical thinking, problem-solving, collaboration, life skills, and persistence (Fogarty & Pete, 2010). This framework led to curriculum and assessment changes focused on projects, thinking creatively, and a commitment to utilizing information and communication technology (ICT) to promote self-directed and collaborative learning (OECD, 2011a). As part of the *Thinking Schools, Learning Nation* framework, Singapore schools promoted the concept of Teach Less, Learn More, which developed and encouraged 21st century skills, such as learning and innovation; career skills; information, media, and technology skills within the core content; and integrating global awareness (Fogarty & Pete, 2010). In an interview conducted by the OECD (2011a), Ho Peng, the Director General of Education in the Singapore ministry of Education, spoke of the rationale behind the Teach Less, Learn More framework:

> [This framework was developed to] touch the hearts and engage the minds of learners by promoting a different learning paradigm in which there is less dependence on rote learning, repetitive tests and instruction, and more on engaged learning, discovery through experiences, differentiated teaching, learning of lifelong skills, and the building of character through innovative and effective teaching approaches and strategies. (p. 163)

Even more recently, Singapore developed its Curriculum 2015 initiatives, which further established students as twenty-first century learners who should be self-directed, think critically, and act as innovators (Stewart, 2012).

In the approach toward 21st century skills, Singapore educational policymakers were insistent on maintaining high standards and realized that new approaches to instruction and pedagogy would be necessary for this to happen (Hairon & Dimmock, 2012). To create the curricular and pedagogical changes that would enable the *Thinking Schools, Learning Nation* framework to be institutionalized, schools relied heavily on the Professional Learning Community (PLC) model. Within this model, teachers included essential questions about teaching and learning and explored interactive methodologies, hands-on learning, collaborative activities, and multimodal learning as ways to deliver subject matter, while integrating 21st century themes (Fogarty & Pete, 2010). Even though teachers were still concerned about high-stakes examinations, through their work in PLCs, they viewed the core curriculum "not as inert knowledge to be 'covered,' but as a dynamic flow of information that incorporates life's challenges in ways that are structured yet experiential, and in ways that are authentic, relevant, and meaningful" (Fogarty & Pete, 2010, p. 109). Throughout this PLC work in the context of new frameworks and initiatives, the researcher believed Singapore demonstrated dedication to the idea of developing 21st century learners.

Japan

Japanese students, like Singaporean students, demonstrated high reading achievement. The 2012 PISA results ranked Japan fourth in reading achievement, with a score of 538 (OECD, 2014c, p. 177). Reforms in Japan recent at the time of this writing emphasized the quality of initial teacher education and local responsibility (Rao, 2013; Wieczorek, 2008). Although Japan dealt with harsh criticism for the high standardization

of their curriculum, Japan's educational system was more complex than it was often portrayed (Park, 2013).

Initial teacher education and professional development. Japan's culture placed a high value on education and demonstrated a high regard for Japanese educators. The focus on Confucian teachings, which emphasized education, and the fact that Confucius was a teacher, led the teaching profession to be a fairly high-status and attractive occupation in Japan, with salaries comparable to salaries for pharmacists, middle managers, and other professionals (Ellington, 2009). The high respect given to Japanese teachers and the smaller school-age population resulted in approximately 60% of teacher candidates employed in public schools, which led to a competitive teaching field (Center on International Education Benchmarking, 2015b, para. 4). The competition among teachers enabled Japanese schools to be very selective during their hiring process.

Japanese educational reform in the 1980s emphasized the development of the teaching force and made teacher education a priority (Rao, 2013). To become a teacher, candidates were required to gain a teaching certificate through completion of a teacher education program at a university and by passing a rigorous exam (Howe & Arimoto, 2014). Unlike Singapore, teacher candidates were afforded many options for their teacher preparation program. Teachers were required to hold a degree from a higher education institution authorized by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) that provided teacher training that included subject area courses, pedagogy courses, and an evaluation by an experienced teacher (Center on International Education Benchmarking, 2015b). Historically, Japan's numerous teacher preparation programs were varied, and students participated in various certification options:

completion of master's degrees, four-year bachelor's degrees, and two-to-three year Associate degrees that resulted in advanced, first class, and second-class certificates, respectively (Howe & Arimoto, 2014). However, a first class certificate was needed to teach in upper secondary schools. After completion of a teacher preparation program, teacher candidates were required to pass a rigorous hiring examination that fewer than half of prospective teachers passed (Akiba, 2013). Those who passed the examination had to complete a one-year intensive induction and mentoring program under a senior teacher, following which they were recognized as a full teacher (Akiba, 2013).

In order to support their educators once they were hired, Japan employed a local, teacher-centered approach to professional development. Each local board of education determined the minimum number of hours teachers should spend on professional development and planned daily in-service training and specific training programs for teachers, while the MEXT held workshops for head teachers and administrators (Center on International Education Benchmarking, 2015b). A highly debated policy included altered requirements for professional development. The Teacher License Renewal Policy (TLRP) was implemented in 2009 and changed the permanent teacher license to one that required renewal every 10 years through participation in 30 hours of university-offered TLRP courses (Akiba, 2013). Although teachers voiced dissatisfaction with the policy change, in a study regarding the policy implementation, Akiba (2013) found that teachers reported positive learning experiences through the required TRLP courses.

Although Japan had formal professional development standards in place, much of the professional development occurred through lesson studies. All teachers participated regularly in scheduled lesson studies and presented their lessons to other teachers for

review (Stewart, 2012). Usually the lesson was recorded by videotape, audiotape, narrative, and/or checklist observations specifically focused on areas identified by the teacher; after the presentation of the lesson, the group of observing teachers and possibly outside educators discussed the lesson's strengths and weaknesses, asked questions, and offered suggestions for improvement (Darling-Hammond et al., 2009).

This practice of lesson study often concluded in large public research lessons (Stewart, 2012). To refine teacher practices, groups of teachers and researchers implemented lesson studies regarding new subjects in the national curriculum over a year's time before holding a public research lesson in which hundreds of educators and policymakers electronically participated (Schleicher, 2012). In this way, Japanese teachers were able to ensure the use of best practices during instruction. The practice of lesson study was implemented in Japanese schools for over the last one hundred years and encouraged teachers to be reflective in their teaching practices, directed teachers to create goals for improvement, generated new teacher practices, and emphasized collaborative research (Arani, Keisuke, & Lessegard, 2010).

Teacher appraisal and feedback. In line with the collective consciousness prevalent in Japanese culture, Japan's approach to teacher appraisal system placed greater emphasis on evaluating the school than on the individual teacher. In the Japanese school system, "Group evaluation, whether of whole schools or of groups of teachers, was thought to promote greater collaboration and sharing of best practices among teachers and to foster cohesion among staff" (Stewart, 2012, p. 110). This mode of thinking was evidenced by Japan's reliance on lesson studies. These lesson studies were an important source of feedback in the Japanese school system and cultivated a high degree of

professionalism by requiring teachers to be accountable to each other for using research-based teaching strategies (Williams & Engel, 2012). In addition to this group accountability, an individual teacher evaluation system was put in place to emphasize individual goals within the school framework. In 2006, the "Evaluation Guidelines for Compulsory Education Schools" were released and placed a heavy focus on self-evaluation (Washiyama, 2009). Under this evaluation system, teachers established personal objectives in collaboration with their administrators and evaluated themselves based on the accomplishment of their objectives (Asia Society, 2013).

As well as reinforcing accountability through lesson studies, the high value placed on education in the Japanese culture promoted high accountability. Significant parental support and pressure resulted in high levels of accountability for teachers and schools (Williams & Engel, 2012). Parents and other community stakeholders also helped to evaluate schools at the local level (Asia Society, 2011). Japan coupled this approach with evaluation and feedback that included other sources of data. For example, according to the OECD (2012), 52% of students attended Japanese schools that used achievement data to monitor teacher practices and 86% of students attended Japanese schools that monitored teacher practices through the use of observations of lessons by the principal or senior staff to monitor teacher practices (p. 85). If teachers were identified as underperforming based on this data, they were taken out of the classroom for a year of retraining; after this, some teachers returned to the classroom, but many were directed to new professions (Asia Society, 2011). Japan's system of teacher appraisal and feedback relied heavily on group collaboration and community feedback to promote professionalism and accountability. However, at the 2013 Teaching Summit, Japan

expressed a desire to improve its methods of teacher appraisal (Asia Society, 2013). According to Japanese representatives at the summit, Japan's goal was to

> reshape its teacher evaluation to increase teachers' motivation, develop the evaluation skills of school leaders, and seek to foster an environment in which teachers can enhance their capacities autonomously. (Asia Society, 2013, p. 26)

School climate. Due to the cultural significance of education, Japan had high expectations of its students, teachers, and schools. On average, Japan demonstrated higher academic expectations of students than many other countries in part because of Japanese cultural factors but also due to rigorous high school entrance examinations (Ellington, 2009). Japanese students were characterized by their high motivation in academics and other extracurricular activities (Wieczorek, 2008). High academic standards, however, may have resulted in what some researchers believed were troubling consequences. For example, PISA scores revealed that teacher-student relationships in Japan were not as strong as many other countries (OECD, 2012). Findings also suggested that Japanese students felt a sense of loneliness, which may have been linked to the relatively poor teacher-student relationships in Japan (Williams & Jain, 2010). According to the 2012 PISA, 28% of students in Japan responded that they agreed or strongly agreed that their teachers were interested in their well-being while the OECD average was 66%; 64% agreed or strongly agreed that teachers were a source of support when students needed extra help compared to an OECD average of 79%, and 73% of students reported that they agreed or strongly disagreed that they get along with their teachers while the OECD average was 85% (OECD, 2012, p. 63). Some researchers expressed concern that teacher-student relationships in Japan resulted in a lack of enjoyment in school and

feelings of loneliness and alienation, which could lead to a lack of incentive for students to become self-directed learners and critical thinkers (Williams & Jain, 2010).

Other concerns within the Japan school climate involved the decreased respect for teachers. Numerous problems such as school bullying, school violence, and poorly managed classrooms led the media to question teacher quality beginning in the mid-1980s (Akiba, 2013). As a result, teachers were met with increased questioning and distrust from the public (Rao, 2013). Concerns over teacher quality created Japanese teacher educational reform to focus on upgrading teachers' professionalism to regain public trust (Rao, 2013). Regardless of these issues, teaching in Japan remained an honored profession due to the high importance placed on education in the Japanese culture (Center on International Education Benchmarking, 2015b).

School leadership. Unlike the school leadership model in Singapore, the school leadership model in Japan was not extensive. Educational reforms focused on devolving more leadership responsibilities to local authorities and schools (Wieczorek, 2008). Japanese schools had a tradition of including few administrators and a smaller ratio of administrators to teachers than was common in the U.S., although schools were working to change this (Ellington, 2009). The relatively small amount of funding on schools in Japan compared to other OECD nations resulted in fewer administrative staff- composed of a principal and a head teacher, who acted as an assistant principal (Center on International Education Benchmarking, 2015c). The principal was responsible for working with external parties and officials from the MEXT while the head teacher generally ran the daily affairs of the school; as a result, teacher committees took on a significant amount of responsibility in the school (Ellington, 2009). Although Japan's

school leadership model was different from many other high-performing nations, the way in which they assigned their leaders had commonalities. Similarly to Singapore and China, school leaders were placed in specific schools in order to improve school performance (Williams & Jain, 2010, p. 153). Effective school leaders were assigned to the most challenging schools as a strategy to more equally allocate human resources and increase student achievement (Stewart, 2013).

Teachers' instructional beliefs and pedagogical practices. Traditionally, one of the most important aims in Japanese education was to train students to work well in a group. Primary schools developed a group mentality by providing an environment "where mutual support, interdependence, and self-discipline are emphasized, with the view to developing a collective consciousness" (Williams & Jain, 2010, p. 153). Although this collective consciousness was customarily integrated into the Japanese school system, this group mentality was criticized for its detrimental effects on the creativity and critical thinking necessary for students to become autonomous learners (Williams & Jain, 2010). Japan's standardized education and uniform curriculum also came under attack for their inability to develop innovative learners and provide individualized learning experiences for students, particularly its gifted and talented students (Park, 2013).

Controversy on the innovation and critical thinking capability of Japanese students engendered changes in the educational system. Contrary to the U.S. push for greater standardization and more testing, educational reform in Japan was characterized by "deconstructing uniform standards, moving away from the pressures of national exams, and focusing more on the interests and potential of each student" (Wieczorek, 2008, p. 99). In the 1980s, reforms emphasized developing the creativity and innovation

of students, while inciting questions on the effectiveness of standardization (Ozturgut, 2011). Then, in 2002, after many Japanese educators and officials expressed apprehension that schools were not teaching students to be critical thinkers who could reason creatively, the MEXT and a high-profile education committee introduced education reforms that eliminated one-third of the national course of study and were designed to encourage Japanese students to become independent thinkers and self-directed learners (Ellington, 2009).

With the changes to the curriculum in 2002 and numerous changes thereafter, Japanese schools presented a much different reality than the quiet, intense places they were often portrayed. Recent to the time of this writing, visitors to Japanese elementary schools reported relatively noisy classrooms with students solving problems together and taking part in hands-on, interactive, and interdisciplinary learning activities (OECD, 2012). Although Japanese teachers employed a whole-class approach, the drilling and rote learning were less prevalent than formerly believed, with Japanese teachers working to cultivate a culture of learning by emphasizing effort over ability, supportive classroom relationships, and engagement of students through creative problem solving (Wieczorek, 2008). Japanese classrooms at the elementary level emphasized hands-on activities, problem solving, higher-order questioning, and creative application (Park, 2013). In Japanese middle and high schools, rote learning and test-driven preparation were more prevalent, but teachers also emphasized problem solving rather than procedural knowledge (Park, 2013).

A normal progression of a lesson included the following: a teacher presented a problem for students to work on, students discussed different problem-solving

approaches in small groups, the teacher provided feedback on students' methods, several students displayed their work at the front of the room, classmates offered students their opinions and explained their reasoning on the different approaches, and the reasoning behind correct and incorrect responses were discussed at length (OECD, 2013a). Throughout this process, correct strategies and incorrect strategies were highlighted to engage students in a conceptual understanding that enabled the application of their learning to new problems not yet encountered (Center on International Education Benchmarking, 2015d). The deep discussions prevalent in Japanese instruction were enacted in classrooms of 35 or more students with varying ability levels, which enabled classes to come up with a wider array of strategies that other students could learn from (OECD, 2012). Additionally, teachers increasingly employed team-teaching to help focus on all the varying ability levels in the whole-class lesson (Center on International Education Benchmarking, 2015d). Japan continued to work toward its goal of developing student-centered learning and creative thinking, and they demonstrated the highest rate of progress on creative skills and attitudes toward learning on the PISA (Asia Society, 2012).

Korea

The reading achievement in Korea was similar to that of its East Asian siblings, Singapore and Japan. Korea ranked fifth in overall reading achievement, with a score of 536 - just behind that of Japan (OECD, 2014c, p. 177). Korea, like Japan, experienced criticism for its standardization, but its then-recent reforms emphasized de-regulation and 21st learning in a contrasting approach to that being implemented in the U.S. (Lee & Park, 2014).

Initial teacher education and professional development. Similarly to other high-performing countries, the teaching profession in Korea was well respected. The Korean culture valued academic pursuits over other labor-based professions, which led to a deep deference and positive image for Korean teachers (Bae et al., 2011). This high status, coupled with a competitive salary and job stability, encouraged talented people to enter the teacher profession at such high rates that Korea was able to be selective towards its teacher candidates, with only the top 5% of primary teacher applicants admitted into the small number of primary teacher education institutions (Bae et al., 2011, p. 147). Secondary teachers were provided with three options for certification: colleges of education, teacher preparation programs in general universities, and graduate schools of education (UNESCO, 2009). Although secondary teachers were presented with more options and institutions than primary teachers, completing a teaching preparation program was not enough to guarantee a spot in the highly competitive Korean teaching field. Following graduation from a teacher education course, teacher candidates were required to pass a three-stage examination process that included a multiple-choice assessment on principles of education and instructional methods, a longer exam that consisted of essays and responses to problem-solving questions related to content knowledge and pedagogy, and a teaching demonstration in front of experts and school leaders (Jensen et al., 2012). This rigorous process served to further ensure the top candidates were selected as teachers. The difficulty of this examination was evidenced by the low passing rate, “As of 2010, only 2,525 secondary prospective teachers passed the employment exam out of 58,706 applicants. It means that on average only 1 out of 23 secondary teacher applicants passed the exam” (Bae et al., 2011, p. 151).

While Korea demonstrated high standards for teacher candidates, the increased global competitiveness and global awareness led policymakers and educational leaders to question the quality of initial teacher education in Korea. To address this concern, in 2010 the Korean Ministry of Education, Science, and Technology implemented reforms to the evaluations used to determine the quality of teacher education institutions (Jensen et al., 2012). As a way to emphasize the importance of high quality education systems, teacher education systems were graded from A to D; these grades were publicized and led to either rewards or negative consequences (such as financial cutbacks) (Jensen et al., 2012). Although the full implications of these reforms were unclear, the changes to the evaluation systems resulted in alterations to many teacher institutions.

Teacher appraisal and feedback. As with the evaluation of teacher institutions, Korean stakeholders expressed dissatisfaction with teacher evaluation models. In fact, Korean reform documents stressed the need for changing the teacher evaluation system since the 1990s, as teacher evaluation had no bearing on tenure or salaries and only mattered when teachers were eligible to become school administrators, which could only occur after several years as a teacher (Kang, 2013). In 2010, amidst opposition from teachers, the Korean government announced the employment of the Evaluation of Teacher Professional Development, the new evaluation system required for all teachers (Seo, 2012). The new teacher evaluation program sought to develop teachers' professional development by providing feedback; to employ a multi-dimensional model using principals, vice principals, peer teachers, and students as evaluators; and to require professional development to teachers who needed to improve their knowledge and skills (Bae et al., 2011). To meet the goals of developing teachers' professional development,

the ratings of the new evaluation system related to a corresponding professional development program. For example, teachers who scored lower than 2.5 (on a scale of 1 to 5) in the peer review and higher than 2.0 in the student survey were required to take 60 hours of professional training in teacher training institutions, while teachers who received lower than 2.5 in the peer review and lower than 2.0 in the student survey were required to take 210 hours of professional training over six months (Seo, 2012, p. 75). If these low scoring teachers were unable to improve their scores in the subsequent year, they were mandated to take 730 hours of professional training in the National Training Institute of Education, Science, and Technology. However, extremely high scoring teachers could take a six-to-12-month sabbatical to focus on educational research (Seo, 2012, p. 75). While the Korean reform was developed to improve teacher quality, many teachers were skeptical of its effectiveness. According to Kyounghye Seo (2012), Associate Professor at Ewha Woman's University in Korea, many teachers found the new evaluation system ineffective due to such a high accountability system that greatly rewarded or punished teachers, ambiguity and a lack of consensus in the areas being evaluated, and unreliable sources of evidence.

School climate. Education was highly valued in Korea. An old Korean proverb demonstrated this value: "A father who wants to make plans for the next 10 years, plants a tree for his son, while a father who makes plans for the next 100 years, invests in the education of his son" (Baek, 2009, p. 43). The educational climate in Korea had strong ties to the collectivist ideals seen in Asian societies, which nurtured a cultural respect for educational values. According to Bae et al. (2011):

> Korea has a long tradition of respect for learning, and seeing the "good life" as a life with balance in material and spiritual wealth. This social value corresponds with the emphasis on the intrinsic value over the extrinsic value of education, and the belief that the ultimate purpose of education is for personal development and spiritual training. These traditional concepts of education are deeply rooted still, and being well-educated has become an indication of being a "great person," which is what accounts for the bulk of Korea's education fever. (p. 68)

Within this collectivist society that highly valued education, conformity was often prized. Students with high levels of conformity were expected to strive for high achievement in the pursuit of gaining knowledge and approving one's abilities (Jiang, Bong, & Kim, 2015). In research that used two studies to test the relationship of conformity to student classroom affect and academic achievement among Korean adolescents, Jiang, Bong, and Kim (2015) found that students with higher levels of conformity expressed greater support and more positive relationships at home and that conformity was linked directly to academic achievement. However, this study also found that conforming behavior was related to stronger feelings of guilt toward students' parents, which may have developed due to the high investments Korean parents made into education.

The value placed on conformity may have resulted in unwanted consequences. Some experts worried the pressure to achieve and to perform well on exams led to depression and illness along with a lack of time to develop creativity and personal interests (Kim, 2013). Increased globalization, however, led to changes in the longstanding tradition of conformity in Korean education. With the growing

connectedness of the world, Korean students were influenced by the ideals of Western democracy and individualism (Kim, 2013). These Western values were thought to have induced a decline in the respect given to authority figures, such as teachers, which resulted in issues with disobedience (Kim, 2013). Although the collectivist ideals greatly impacted the school climate in Korea, an increasingly global society continued to cause shifts in the atmosphere in Korean schools.

School leadership. The development of school leaders in Korea relied on a well-defined and carefully regulated procedure. Regular teachers could obtain a vice principal license in the following ways: teach three years and complete a professional development program for leadership (Level 1 license) or teach six years and complete a professional development program for leadership (Level 2 license) (Kang, 2013). To obtain a principal license, those with a vice principal license must have completed three years of educational experience with their license and completed a designated professional development program for leadership (Kang, 2013). It should be noted that simply having the requisite experience was not sufficient to participate in principal training. In a summary of an international survey of school leadership conducted by the Finnish National Board of Education, Taipale (2012) pointed out that although selections of principal and leaders is usually decided by a local board or committee, Korea utilized a system that took selection decisions away from the schools' administration and required an appointment from the President based on a recommendation from the local superintendent (Taipale, 2012). The researcher found no evidence of a focused plan to include leadership opportunities for teachers. In fact, Bae et al. (2011) referred to the

career structure of Korea as "simple and flat" with "few opportunities for teachers to exercise leadership roles" (p. 155).

Teachers' instructional beliefs and pedagogical practices. Regardless of its status as a top performer, Korea, like Japan, encountered harsh criticism for the standardization of its educational system. The Korean media were quick to dismiss Korea's success on international comparisons as the result of excessive competition, private tutoring, and education fever (Waldow, Takayama, & Sung, 2014). Private tutoring was the norm in East Asian countries such as Korea and played a large role in the education of Korean children. Most parents in Korea spent a considerable amount of money to provide private tutoring services that would boost their children's academic achievement (Park, Byun, & Kim, 2011). As with Japan, one common criticism leveled against Korean education was that the uniform curriculum failed to provide individualized learning experiences and was detrimental to the achievement of gifted and talented students, but data from international assessments did not support this assertion (Park, 2013). Another often repeated stereotype about the Korean educational system was that drills, memorization, and standardized testing had diminished students' creativity and innovation (Lee, Kim, & Byun, 2012; Park, 2013). Although Park (2013) admitted that rote learning, drill-orientated teaching, and test-driven learning became increasingly prevalent in middle and high school, he argued it did not necessarily follow that rote learning and memorization were mutually exclusive. In fact, there was little empirical evidence to support the claim that Korean students were less innovative and creative than other countries with less standardized systems (Lee et al., 2012; Park, 2013).

In contrast to American reforms that focused on raising standards and unifying curriculum and assessment, Korean reform emphasized deregulating its schools and developing the individual capacity of each child (Lee & Park, 2014). Korea's education system was decentralized in 1991 and made the Korean Institute for Curriculum and Evaluation (KICE) responsible for national assessments (Smith, 2014). In the early stages of the reform, external testing was supposed to play a role in evaluative policy, but pressure from the public and teachers resulted in the elimination of external tests at the elementary level with a mitigation of tests at the middle school level (Smith, 2014). Further reforms in Korea were both praised and called into question. In 2009, the National Curriculum was implemented to move away from a large emphasis on textbook knowledge; this reform was praised for its focus on creativity, character, diverse teaching methods, and technology (OECD, 2014e). In opposition to this praise, Lee and Park (2014) stated that school reform policy changes in Korea "did not significantly change school practices and affect student outcomes" (p. 398). Although the policy implications of the latest educational reforms remained unclear for Korean education, the de-emphasis on standardization and rote learning stood in stark contrast to the most recent American reforms.

Finland

Finland's educational system earned worldwide interest and recognition, particularly in the field of teaching training, following the release of the first PISA results (Uusiautti & Määttä, 2013). Although Finland slipped in standing on the 2012 PISA, its reading achievement remained high. Finland's overall reading score of 524 in the 2012 PISA resulted in their ranking sixth in overall reading achievement (OECD, 2014c).

Strategic reform initiatives, such as implementing stricter requirements for teacher candidates, devolving more responsibilities to individual teachers, and emphasizing individual learning needs may have contributed to Finland's international success (Sahlberg, 2015; Stewart, 2012; Taipale, 2012).

Initial teacher education and professional development. In the field of comparative education, Finland's teacher preparation program stood out as a successful model dedicated to developing a high quality workforce. Beginning in 1979, Finland instituted rigorous requirements for teacher candidates and moved teacher preparation to universities (Stewart, 2012). Later changes included an effort to develop teaching as an academic profession by requiring teachers to complete a master's degree including a master's thesis as a final requirement (Ornstein & Hunkins, 2012; Stewart, 2012; Uusiautti & Määttä, 2013). The requirement of a thesis enhanced the focus on utilizing research in teaching and "laid the foundation for the idea of seeing teachers as researchers in their own field of work" (Uusiautti & Määttä, 2013, p. 6). By increasing the requirements of teacher education and emphasizing the teacher's role as a researcher, Finland elevated the status and professionalism of Finnish educators. As Lovonen, the Director of Teacher Education at the University of Helsinki, pointed out, the teachers in Finland were considered professionals in the same way as lawyers or doctors were viewed as professionals (as cited in Sawchuk, 2012).

The heightened professionalism of teachers made teaching a highly respected and sought after career in Finland, which allowed Finland to be selective in choosing teacher candidates. Numerous graduates consistently applied for teacher preparation schools, but after a national entrance exam and personal interviews only one in 10 applicants were

accepted into these government-funded programs (Stewart, 2012, p. 99; Rukspollmuang, 2014, p. 80). Once accepted into these programs, Finland developed its teachers by emphasizing research, developing pedagogical content knowledge, providing good training for diagnosing learning difficulties and adapting instruction to meet students' needs, and a requiring a "very strong clinical component" (OECD, 2011a, p. 125). The clinical component of the teacher education program, or student teaching experience, consisted of a full year of working with an experienced teacher while learning how to use research-based instructional methods (such as cooperative and problem-based learning), experimenting with different instructional methods, and learning to view the classroom as a place for collaboration and questioning (Ornstein & Hunkins, 2012). Teacher candidates also studied student assessment, differentiated instruction, and curriculum development (Stewart, 2012).

Although the researcher found many sources commending the Finnish teacher preparation program, the professional development program for Finnish teachers was rarely discussed and not presented as a model worthy of emulation. According to the OECD (2011a) the professional development system in Finland varied largely based upon the local municipality. While teachers were required to partake in three professional development days per year, time beyond these days and type of professional development were up to individual municipalities and schools (OECD, 2011a; Sahlberg, 2015). Sahlberg (2015), author of *Finnish Lessons 2.0: What Can the World Learn from Educational Change in Finland*, admitted Finnish educational leaders recognized the lack of alignment between initial teacher education and professional development and the lack of focus on essential areas of teaching.

Teacher appraisal and feedback. High standards for teacher development contributed to a large amount of professionalism in the Finnish education field, which formed the basis of how teachers received appraisal and feedback. Trust and respect in educators made a formal evaluation system unnecessary (Richardson, 2013; Sahlberg, 2015), and in the early 1990s Finland did away with the formal appraisal system that provided external feedback to teachers (Williams & Engel, 2012). According to the OECD (2011a), while many schools in OECD member countries monitored teachers with student interviews, direct observations, and/or formal appraisals, principals in Finland rarely used any of these methods; of these methods to scrutinize teachers, 18% of students attended schools that used student assessments, 20% of students attended schools that used more direct observations, and only 2% of students attended schools that used observations from inspectors or other external individuals (p. 52). In place of such measures, educators took part in a reflective, collaborative, and formative process to improve their skills. Principals drew on their experience as teachers to facilitate teachers in recognizing strengths and improving areas of weakness (Sahlberg, 2015; Williams & Engel, 2012). Much of the feedback received by teachers came from their colleagues. Within the daily schedule, teachers worked together to reflect upon their practice and participated in peer coaching, which contributed to a sense of leadership and shared responsibility (Sahlberg, 2015). Rather than relying on market-based reforms and external forms of accountability, "The Finnish system relies on the expertise and professional accountability of teachers who are knowledgeable, academically strong, well-educated, and committed to their students and communities" (Stewart, 2012, p. 113).

School climate. Supporting the complete well-being of each student, rather than focusing solely on the academic well-being of each student, was a hallmark of the Finnish education system. In order to provide the comprehensive support needed to foster the well-being of the whole child, each school formed a group of professionals made up of the principal, regular education teachers, special education teachers, school psychologists, nurses, and social workers that collaborated to find ways to bolster students in their development (Toom & Husu, 2012). An array of services were necessary to achieve this level of support. Schools provided a hot meal for every student, health and dental services, counseling services, and access to mental health and other services for families in need, reflecting "a deep societal commitment to the well-being of all children" (OECD, 2011a, p. 122). Teachers were expected to assess student support needs and engage in tasks that benefited student welfare, such as guidance and counseling (Finnish National Board of Education, 2011). Engaging all stakeholders in the process of learning and development was also a key piece to Finland's system. The Core Curriculum not only pointed out the importance of cooperation among teachers and other experts but also with students and their parents and guardians (Finnish National Board of Education, 2011). Partnerships between school and home included active parental involvement in curriculum work, school board membership, discussions on how to assess students, school events, and other school meetings (Toom & Husu, 2012). Students participated in their learning through an equal and democratic relationship with their teachers that encouraged trust and respect (Toom & Husu, 2012).

As with teacher development and teacher feedback and appraisal, the professionalism afforded to teachers was a key factor in the school climate of Finnish

schools. Finnish reforms focused on promoting responsibility of educators rather than relying on external accountability policies that diminished professional responsibility (Sahlberg, 2015). According to Sahlberg (2015) "sample-based testing of students, thematic assessments of schools, reflective self-evaluations by teachers, and an emphasis on creative learning have established a culture of mutual trust and respect within the Finnish education system" (p. 175). Development of trust and respect led to a high level of satisfaction among teachers in Finland. A 2012 national job satisfaction survey found teachers to be the most satisfied professional group with their satisfaction stemming from the freedom to express themselves and the role they played in shaping children's lives (EPSI, 2012). The researcher believed the deep commitment to students' needs combined with the professional respect afforded to teachers was essential to promoting productive and trusting relationships among all the stakeholders in the Finnish educational system.

School leadership. School leadership in Finland underwent major shifts during the time of decentralization. In the 1990's the administration of schools was decentralized, and schools were given more decision-making responsibilities (Taipale, 2012). The 1994 National Core Curriculum for Basic Education emphasized the role of teachers and schools in planning curriculum (Uusiautti & Määttä, 2013). Devolving responsibility to local educators was viewed by some educational experts as the stimulus of Finland's high achievement on international assessments. According to Ornstein and Hunkins (2012), one of the main reasons for Finland's educational success involved "going from an agency that was highly centralized managing education with curriculum guides exceeding 700 pages to an organization working more as a catalyst to get

educators at the local level to assume responsibility for creating curricula and assessments" (p. 282).

Decentralizing education resulted in teachers being viewed as leaders. Although the career structure for teachers did not allow for much movement, teachers were responsible for curriculum planning, student growth, introducing new instructional methods, assessment, leading teacher teams, and mentoring new teachers (Asia Society, 2015; Stewart, 2012). To meet these responsibilities, teachers were given a lighter teaching load and more time to plan and collaborate. Teaching was broken into 45-minute lessons each followed by a 15-minute recess, with primary school teachers generally teaching four or five of these lessons and junior high teachers teaching five or six (Sahlberg, 2013, p. 37). Additionally, Finland's teacher contracts included an allotment of three hours of professional collaboration per week (Asia Society, 2015).

As with teachers, Finnish principals were given considerable responsibilities and autonomy. Principals were responsible for school development, human resources, school operations, and operational effectiveness (Taipale, 2012). Additionally, principals had teaching responsibilities determined at the local level that required them to have teaching qualifications for the school in which they were principal; these teaching responsibilities assisted in the development of trust and communication between teachers and principals (Sahlberg, 2013). Other qualifications included a Certificate in Educational Administration (15 credits) or completion of a university program in educational leadership (25 credits) in addition to a Master's degree and a large amount of experience (Taipale, 2012). Like teachers, principals were not assessed by external standardized assessments, which increased autonomy and enabled principals to focus on creating a

common mission, excellent teachers, and collaborative leadership rather than focusing on performance outcomes (Stewart, 2012). Although principals in Finland enjoyed autonomy, a study by Atso Taipale and sponsored by the Finnish National Board of Education (2012) observed that the resources given to Finnish school leadership were scarce and suggested need for reform in local organizations that maintained schools.

Teachers' instructional beliefs and pedagogical practices. Educational reform in Finland emphasized cultivating individual learning needs of students. In the 1980's the tracking of students was abolished, and schools assumed the paradigm that schools must work to develop the individual aspects of students' talents and intelligence by implementing different instructional methods based on student needs (Sahlberg, 2015). The 1994 National Curriculum placed importance on providing students with opportunities to develop different talents and intelligences, included a requirement that the development of curriculum should utilize constructivist educational ideas, and suggested the use of cooperative learning strategies (Sahlberg, 2015). The Core Curriculum for Basic Education developed in 2004 expanded on these ideals: "The learning environment must guide pupils in setting their own objectives and evaluating their own actions. The pupils must be given the chance to participate in the creation and development of their own learning environment" (p. 16). These reforms resulted in the creation of learner-centered environments. Students in Finland took responsibility over their learning by designing learning activities, and learning in most upper secondary schools was based on individual student study plans that allowed students to proceed at their own pace (OECD, 2011a). Classrooms were seen as laboratories where teachers and students collaborated in investigations and also as a place where ideas could be

challenged (Ornstein & Hunkins, 2012). Implementation of these principles required alternate and varied assessment techniques. Finnish classrooms focused on assessment methods such as portfolio assessments, performance assessments, and self-assessments (Sahlberg, 2015), while offering feedback in narrative form that focused not only on the student's knowledge but also on the learning process utilized by the student (Ornstein & Hunkins, 2012). The spirit of collaboration and professionalism among Finnish teachers was essential in creating these types of child-centered environments (Toom & Husu, 2012).

Instructional methods and curriculum in Finland continued to be refined to fit students' needs. At the 2014 International Summit of the Teaching Profession, Finnish educators discussed their plans to make learning more engaging for students by utilizing more technology and developing 21st century skills in their students (Asia Society, 2014). Other changes in Finland were wide-reaching and involved shifts in the entire Finland curriculum. At the time of this publication, local schools in Finland were preparing to adjust their local curricula to a new curriculum reform that would be phased in during the fall of 2016 (Halinen, 2015). According to Halinen (2015), the Head of Curriculum Development on the Finnish National Board of Education, the key objectives of the reform included "developing schools as learning communities, and emphasizing the joy of learning and a collaborative atmosphere, as well as promoting student autonomy in studying and in school life" (para. 3). The curriculum reform emphasized multi-disciplinary, project-based learning that took into account student interest and required students to take responsibility for planning and implementing these projects (Halinen, 2015). Although this curriculum reform had a larger focus on project-based

learning, it maintained the learner-centered values that were at the heart of instructional practices in Finland.

Poland

Since the administration of the first PISA in 2000, Poland continued to demonstrate growth. Between 2000 and 2012, Polish student achievement was the third highest level of improvement when compared to all of the participating countries in the PISA (Delaney & Kraemer, 2014), and ranked eighth in overall reading achievement on the 2012 PISA with a score of 518. Although Poland's progress had been evident, the way in which Poland achieved this growth was not quite as clear. In researching the Polish education system, the researcher was able to find a limited number of then-current sources on the state of the education system; however, many sources described the significance of Poland's relinquishment of communism and the educational reforms that followed (Bodine, 2005; Hamot, 1998; Wojcik, 2010).

Initial teacher education and professional development. The fall of communism in Poland had direct implications for teacher training. When Poland abandoned communism, the Ministry of National Education revised the teacher certification standards, which led to more courses in pedagogical studies (Hamot, 1998). To keep new teachers from resorting to lecture and examination methods, educational reformers developed teacher education courses that combined content with instructional methods (Hamot, 1998). Additionally, the Ministry of Education requested the Higher Education Council increase the number of hours in revised pedagogical studies and allocate more time for teacher candidates to observe and student teach (Hamot, 1998). In 2012, the International Bureau of Education of the United Nations Educational,

Scientific, and Cultural Organization (UNESCO- IBE) explained that teachers in Poland were required to have subject-related, pedagogical, information communications technology, and foreign language training in addition to having the appropriate skills to collaborate with other teachers, students, students' families and the community; create plans to utilize effective instructional practices; and manage their professional development. Additionally, Polish teachers were required to obtain a higher education certification (UNESCO- IBE, 2012). Pre-primary and primary teachers were required to earn a three-year bachelor's degree, a five-year master's degree, or a three year diploma from a training college or foreign language training college; lower secondary teachers were required to have a three-year bachelor's or a five-year master's; and upper secondary teachers usually had a five-year master's (UNESCO-IBE, 2012). Although these training options were most prevalent, higher education graduates with no teaching specialization could obtain teacher qualification through postgraduate studies or inservice training (UNESCO-IBE, 2012).

As with teacher training, the fall of communism affected the way in which teachers participated in professional development. Rather than require professional development, in 1999 Poland elected to make it mandatory and at the discretion of each teacher (Mourshed, Chijioke, Barber, & McKinsey, 2010). In an interview conducted for the report, a Polish system leader explained the decision: "It is very difficult to impose anything on anyone in Poland. [. . .] This is a reaction to our centralized past with communism and martial law" (Mourshed et al., 2010, p. 65). Teacher professional development was provided in various forms to meet the needs of teachers. Free education courses were offered by higher education institutions as evening and part-time courses,

while the National In-service Teacher Training Center also provided several options for educators to choose from based on their experience and education (UNESCO-IBE, 2012).

To ensure these courses would be utilized, Poland created an incentive. This incentive was a career path tied to salary that allowed teachers to progress through four levels with completion of professional development (Mourshed et al., 2010). This effort to motivate teachers to engage in professional development and encourage autonomy in their professional development choices was not always met with teacher satisfaction. In fact, a report by the Polish Educational Research Institute (2013) indicated that teachers perceived the career ladder as a way to force them to sacrifice their private life, and when determining the positive aspects of the motivation scheme, many teachers only pointed out its financial benefits- only one third mentioned feeling motivated to continue professional development.

Teacher appraisal and feedback. Educational reformers carried the value of autonomy for schools and teachers into the area of teacher appraisal. The school director and school board had complete responsibility in deciding and implementing teacher performance evaluation procedures, although all teachers were to be assessed on planning and preparation, instruction, classroom environment, professional development, individual contributions to school development, and interactions with community stakeholders (OECD, 2013d). Two main types of assessments were carried out by school directors in order to evaluate teachers. School directors assessed the teacher's performance as instructional leaders, and directors also assessed teachers' professional achievements as part of the promotion process (Polish Eurydice Unit, 2012). A third option for appraisal existed outside of these two types. An evaluation could be

commenced if it was requested by a concerned teacher, the local government, the superintendent, the school board, or the parent's council (OECD, 2013d). An appraisal of this type was implemented by the school director, evaluated all components of a teacher's performance, could affect decisions on professional development and/or salary, and if negative could have led to dismissal from the teacher's position (OECD, 2013d).

School climate. Decentralization of the educational system was a noticeable undercurrent in the school culture in Poland. During the communist reign, public distrust was rampant in Poland and led to minimizing the central state's role in education (Bodine, 2005). The resulting decentralization created a shift in the thinking of educators. Educational ideals were characterized by openness and liberation and a focus on liberal democratic principles and a respect for diversity (Godon, Jucevičienė, & Kodeljå, 2004).

The responsibility and autonomy given to educators contributed to the way in which the field of education was viewed in Poland. In a similar way to other high-performing countries, the profession of education in Poland was shown considerable respect. Teachers were ranked by the Public Opinion Research Center as in the top ten as prestigious professions for decades- only marginally behind university professors and engineers from the manufacturing industry (Educational Research Institute, 2013). Additionally, teachers' work was viewed as stressful, responsible, and challenging, and teachers were regarded as highly qualified and motivated people who strived to keep improving their craft (Educational Research Institute, 2013).

School leadership. Decentralization of Poland created large shifts in power. Educational reformers believed that schools could not be effectively managed from a distance, and delegated decision-making responsibilities at each level (Mourshed et al.,

2010). The Ministry of National Education developed and implemented educational policy and core curricula, while local municipalities and districts were responsible for the administration and financing of public schools (UNESCO-IBE, 2012). School heads, or principals, were given various duties related to their school. School heads were appointed for a five year term in which they were responsible for the following activities: managing and representing the individual school, being an instructional leader and supervising teachers' instruction practices, caring for students and providing appropriate learning conditions, implementing decisions made by the school council or teacher's council, properly managing funding, organizing student teacher placements, and working with other organizations and individuals to provide appropriate activities for the school (Polish Eurydice Unit, 2012). With the extensive responsibility under the purveyance of school heads, Poland was concerned that the then-current system of principal training was insufficient. According to the school leaders at the 2015 International Summit of the Teaching Profession, Poland revealed it was in the development stages of a new principal training program (Asia Society, 2015).

As principals were given more responsibilities after the 1999 educational reform, so were teachers. In addition to teachers' responsibilities in creating curriculum and implementing lessons, each school was expected to have a teachers' council (Delaney & Kraemer, 2014; Polish Eurydice Unit, 2012). The teachers' council was instrumental in making educational decisions at the local school level and provided teachers with an opportunity to partake in leadership activities in their school community. The teachers' council was comprised of teachers and staff responsible for education and staff of the students (Polish Eurydice Unit, 2012). The council was responsible for the approval for

the school action plan, decisions involving assessment and scoring of students, and issuing opinions on school activities plans, among other duties (Delaney & Kraemer, 2014). The involvement of both principals and teachers characterized the leadership of Polish schools.

Teachers' instructional beliefs and pedagogical practices. Before communism ended, teachers had very little choices in the way in which they taught. "Through its hierarchical approach to curriculum implementation, the Communist Party reduced the teacher's role to that of a technician following a scripted outline" (Wojcik, 2010, p. 606). Uniformity was key during communist control. Educational policies dictated that teachers at each grade level would teach the same lessons from the same book with the same instructional methods, and students were not supposed to question the state (Hamot, 1998). These educational policies experienced a major shift in the 1999 educational reform. As a backlash against former communist ideals and prescriptive curricula, the concept of core curricula was put into place to provide schools with autonomy and allow them to take responsibility for their students' learning (OECD, 2011b). In order to promote this responsibility, schools in Poland, like schools in Finland, were given the ability to develop their own curricula. Schools developed curricula to meet the three goals of education set forth by the core curricula: imparting knowledge, developing skills, and shaping attitudes (OECD, 2011a). While the Ministry of National Education set forth requirements and provided approved teacher programs (which teachers could decide not to use), teachers collaborated together and consulted with parents, and taking student needs and local culture into account, decided on the curricula for their school (UNESCO-IBE, 2012). Curricular reform was developed to empower teachers to be more

independent and innovative and allow teachers to be utilize their own teaching style and take into account individual student needs (Delaney & Kraemer, 2014; OECD, 2011b).

Assessment of student learning was largely decided by teachers, but a national examination was put into place to assess national standards. Throughout the school year, teachers utilized their own assessments to determine each student's educational attainment and to support the student's development (UNESCO-IBE, 2012). Beginning in 2002, students at the end of grade 6 were evaluated by a mandatory external standardized test to assess student knowledge of reading, writing, reasoning, using information and applying knowledge in practice (Polish Eurydice Unit, 2012). Although those test results were only for information purposes, in the 2006-2007 school year, upper secondary students took the new matura exam for the first time, which determined their access to higher education (UNESCO-IBE, 2012). Aside from these assessments, much of the instructional practices and assessments in Polish schools, as noted in the literature, were at the discretion of schools and teachers (Delaney & Kraemer, 2014; UNESCO-IBE, 2012).

United States

The U.S. had not fared well in international assessments. In the 2012 PISA, the U.S. scored a 498 in the reading portion, which resulted in the ranking of 17th compared to other participating nations (OECD, 2014c, p. 177). Policymakers and educational leaders cried out for change (Duncan, 2009; Stewart, 2012). However, the market-based reforms and high standardization were questioned and dismissed as inappropriate by many educational researchers (Darling-Hammond, 2012; Friedrich, 2014; Fullan,

Rincón-Gallardo, & Hargreaves, 2015; Ginsberg & Kingston, 2014). At the time of this study, the U.S. continued to emphasize standardization, testing, and accountability.

Initial teacher education and professional development. Teacher preparation in the U.S. was a source of contention among educational reformers. Although the method of improvement created disagreement, educators and policymakers largely agreed on the need for change in teacher preparation programs (Cochran-Smith, Piazza, & Power, 2013). Among the strongest voices decrying the poor quality of teacher education programs was Arne Duncan, the United States Secretary of Education. According to Duncan (2009) most schools and colleges were "doing a mediocre job of preparing teachers for the realities of the 21st century classroom," and he stressed the need for "revolutionary change" (para. 3). Complaints levied against university-based teacher education programs included low admission standards, weak preparatory programs, and unprepared graduates who were not ready to lead a classroom (Levine, 2010). To combat these perceived issues, the Obama Administration released a plan to improve teacher preparation. Components of this plan included promoting the teaching profession and recruiting highly qualified individuals by using the TEACH recruitment campaign; improving the preparation of teachers by investing in innovative programs that provided intensive clinical training; and providing in-service development and support through The Race to the Top and ESEA Flexibility Plans, which included new state systems of teacher evaluation that aligned professional development with teachers' strengths and weaknesses based on a clear idea of teacher effectiveness (USDOE, 2011).

Other educators, while in agreement on the need for improving the quality of initial teacher education programs in the U.S., questioned the conflicting reforms

instituted in the name of improvement. On one hand, standards were raised for university-based teacher candidates, and the federal government tied grant funding to student learning in classes taught by graduates (Levine, 2010). On the other hand, alternative teacher preparation programs were created to make it easier to become a teacher. The alternative routes sometimes required limited time, such as a few weeks, learning the basics of education, and then assigned them to classrooms as full-time teachers (Friedrich, 2014). Many educational scholars viewed the increase of alternative routes as an effort to de-professional teachers, impose free-market procedures, and diminish the strength of unions (Friedrich, 2014).

While alternate routes to certification existed, university-based programs remained the way in which most teacher candidates were educated. Pre-service teaching programs through a university included a traditional four-year undergraduate, a five-year joint bachelor's and master's, or the completion of a one-or-two-year master's after attaining a separate bachelor's degree (Darling-Hammond, 2012). Within the different preparatory programs, differences were considerable. Most programs included courses in subject matter and instruction, child development and learning, curriculum and assessment, and instructing students with special needs; however, these programs were regulated differently in different states and could include dissimilar content in similar courses, student teaching as short as five weeks or as long as thirty weeks, and instruction in settings unsuited to modern practice (Darling-Hammond, 2012). The researcher concluded these wide differences in teacher preparation contributed to the concern over quality of teachers in the U.S.

Prevalent concern over the quality of teacher education in the U.S. coincided with concern over the professional development provided to educators. In comparing the development of American teachers to other high-performing countries, Stewart (2012) criticized the lack of mentoring and assistance of new teachers, and referred to the professional development offered to American teachers as "a preponderance of ineffective, one-off seminars, so-called 'drive-by' professional development rather than the kind of long-term support with feedback and opportunity for practice that is thought to be more effective and connected to school improvement" (p. 105). Stewart (2012) also lamented the quick succession of policy reforms that were enacted with little or no teacher training.

Teacher appraisal and feedback. The way in which American teachers were evaluated was undergoing a shift at the time of this study. Traditionally, evaluation systems were left up to local education agencies, and were therefore highly variable (Darling-Hammond, 2012). Experts worried that the evaluation systems did not accurately measure high quality teaching and did not allow principals to provide needed support (Liang, 2013). In the 1980s, the focus of evaluation shifted from observable teaching behaviors to accountability, professional development, and school improvement (Liang, 2013). This emphasis continued in the evaluation policy changes following the granting of federal waivers. In the 2012-2013 school year, the Department of Education offered waivers for certain provisions of the Elementary and Secondary Education Act (USDOE, 2012). In order to receive these waivers, local education agencies had to commit to certain requirements; one of these requirements was the commitment to develop and implement an evaluation system that included data on student growth and

would be used to inform personnel decisions (USDOE, 2012). As a result of these waivers and other incentives from Obama's Race to the Top grants, Hull, the Senior Policy Analyst for the Center for Public Education, reported in 2013 that forty-one states required or recommended that teachers were evaluated with multiple measures, such as student achievement data, classroom observations, student surveys, lesson plan reviews, teacher self-assessments, student artifacts, teacher portfolios, and others (p. 9). Student growth was mainly measured in two ways: value-added models (VAMS), which try to separate a teacher's impact on student growth from other factors, and student growth percentiles (SGP), which measured a student's growth in relation to other students (Hull, 2013). Although Hull (2013) applauded student use of data as a way to more accurately measure effectiveness and VAMS, in particular, as "one of the best tools available for measuring teacher effect," other educational researchers had grave concerns about the use of student data and value-added models (p. 9).

The use of high stakes testing in the U.S. to increase accountability were troubling to many experts in the field. Fullan, Rincón-Gallardo, and Hargreaves (2015) stated, "The evidence is clear that current systems of external accountability in the U.S. are not producing increased student performance" (p. 3) and warned about the harm policymakers could inflict by trying to do at the back end with imposing external accountability measures what they should have done at the front end with building the capacity of educators. In international comparisons, it was determined that the U.S. utilized external accountability measures to achieve improvement more heavily than many of the more successful systems (Mourshed et al., 2010; OECD, 2011). Instead, successful systems were focused on developing the individual and the capacity of

educators through internal forms of accountability (Fullan et al., 2015). Other fears regarding external accountability among educators included the narrowness of the tests that only assessed a limited amount of student learning, teachers feeling pressured to teach to the test while forgoing other kinds of learning, the shrinking of the curriculum, and the limiting of creativity (Darling-Hammond, 2012; Ginsberg & Kingston, 2014). In regards to the use of the value-added model, Darling-Hammond (2012) presented three major concerns: value-added models of teacher effectiveness were unstable and varied significantly based on year, test, and class; value-added ratings are significantly affected by differences in students, even when certain factors are controlled; and value-added ratings cannot separate the many influences on student progress. Although educational researchers offered harsh criticism against external accountability measures, it played an important role in the evaluation of American teachers.

School climate. Climate throughout schools in the U.S. appeared to be advantageous for students but much less so for teachers. According to the OECD (2013a) 15-year-olds in the U.S. reported one of the best teacher-student relations among OECD countries. On one indicator, whether teachers were interested in their [as rated by the students] well-being, over 80% of students agreed or strongly agreed (OECD, 2013a, p. 34). Belief in individuality and independence was also a contributing factor to students' satisfaction with school. The American education system fostered students' talents and interests through extracurricular activities and developed in students the idea that their own efforts could make a difference in their life (Zhao, 2009).

On the other hand, teachers reported less satisfaction in their work. In the last MetLife (2013) survey of the American teacher, morale was at the lowest in the previous

25 years and dropped five percentage points since the year before, declining from 44% to 39% (p. 45). Since 2008, teacher satisfaction had dropped 23 percentage points (MetLife, 2013, p. 45). Additionally, teacher attrition rate remained high, especially among high-needs schools and new teachers (Holland, Eckert, & Allen, 2014). Stress, a factor in teacher satisfaction and attrition, continued to climb. More than half (51%) of teachers reported feeling under great stress at least several days a week (MetLife, 2013, p. 45). When asked to report on the level of teacher morale at their school, principals in the U.S. rated teacher morale as lower than the OECD average by 10% (OECD, 2013a, p. 35). Although many factors determined teacher morale, the educational reforms based on external accountability played a role in the deficiency of teacher morale. According to Thomas (2013) "Punitive teacher accountability linked to student test scores will continue to debase and de-professionalize the exact teachers we claim must be highly qualified." (p. 227).

School leadership. Principal preparation programs in the United States were criticized for their quality. According to Stewart (2012), admission standards were low, clinical experiences were insufficient, curriculum lacked a focus on data and turning around low-performing schools, and preparation programs were approved with little question. Another issue with school leadership was the flat career structure of schools in the U.S., which required teachers to become an administrator if they wanted to take on a leadership role or increase their salary; however, the administrative tasks offered little time to assume the role of instructional leader (Stewart, 2012). Teacher leadership was further undermined by external accountability systems based on high-stakes tests, which often led principals to micromanage and exert control over teachers (Berry, 2013).

Additionally, teacher leadership was hampered by the lack of leadership development of teacher candidates and the failure of principal training to enable administrators to create opportunities for teachers to take on leadership roles (Berry, 2013).

Beset with these issues, the U.S. decided to make a concentrated effort to improve educational leadership. In 2014, stakeholders such as principals, superintendents, education professors, and others met to update the national standards for educational leadership to include a larger emphasis on leadership for learning, capacity building, and developing a community within the workplace (Young, 2015). Teacher leadership was also an area of ongoing discussion and concern. To improve student outcomes by increasing teacher leadership opportunities, the National Board for Professional Teaching Standards and the U.S. Department of Education implemented the "Teach to Lead" initiative (Asia Society, 2015). "Teach to Lead" held a series of teacher leadership summits and planned to convene a national summit to work toward "creating space for teachers to lead without leaving the classroom empowering teachers to be innovative, and involving teachers in informing policy" (Asia Society, 2015, p. 21)

Teachers' instructional beliefs and pedagogical practices. Instructional practices in the U.S. were largely variable but often touted the idea of best practice. In their book *Teaching Matters Most: A School Leader's Guide to Improving Classroom Instruction*, McCann, Jones, and Aronoff (2012) explained that while American teachers discussed their implementation of practices that aligned with research and best practices, their actual practice was inconsistent with this idea. Rather than utilizing best practices, teachers often relied on the "assign-and-assess" method where teachers did most of the talking and students did most of the listening (McCann, Jones, & Aronoff, 2012, p. 5).

On the other hand, Zemelman, Daniels, and Hyde (2012) stated their observations of "sincere and dedicated educators doing their level best for the kids in their care," although they readily acknowledged that students in low performing schools were more likely to be subjected to a dumbed-down curriculum that required them to be passive learners (p. 22).

Reforms based on external accountability were questioned as to their ability to encourage best practices in American schools. International comparisons demonstrated that while other countries utilized school performance data to identify best practices, the U.S. tended to use school performance data solely to enforce accountability (OECD, 2013d). Accountability measures such as high-stakes tests created concern in many educational researchers who were concerned that the overuse of test scores as accountability measures could create problems such as narrowing the curriculum, teaching to the test, and forgoing creativity (Berliner, 2011; Darling-Hammond, 2012; Ginsberg & Kingston, 2014; Ornstein & Hunkins, 2012). Sahlberg (2015) expressed his belief in the U.S. as home to impressive educational research and innovation but suggested that this research and innovation were unable to thrive because "the work of the school in the U.S. is so much steered by bureaucracies, test-based accountability, and competition that schools are simply doing what they are forced to do in this awkward situation" (p. 170). Others expressed their belief that problems with instruction stemmed from a decentralized curriculum that varied greatly among states (Merry, 2013).

The Common Core State Standards originated in 2009 by state school chiefs and governors to develop consistent learning goals across individual states (Common Core State Standards Initiative, 2015). By 2013, 46 of 50 states agreed to the standards in math

and language arts to raise expectations and provide more rigorous learning experiences, so students were college and career ready (Asia Society, 2013, pp. 8-9). Developers of the standards praised the Common Core State Standards for the following qualities: based on educational research and evidence, clear and consistent, aligned with college and career expectations, required the application of higher-order thinking skills, developed using the best of state standards, and designed to prepare students for success in the global economy (Common Core State Standards Initiative, 2015). Since their release, the Common Core State Standards were met with staunch supporters and harsh critics. Supporters of the Common Core praised the document for its challenging curriculum, recommendations for more active classrooms, and the pedagogical decisions being left to the discretion of teachers (Zemelman, Daniels, & Hyde, 2012). Criticisms aimed at the Common Core included not inviting teachers in the creation of the standards, lack of contemporary literature, overwhelming length of document, (Zemelman et al., 2012) and an inadequate review of the educational research (Kern, 2014). Other critics claimed it ignored the real problem of the American education system, noted as poverty, and would only continue to enhance the narrow, test-prep curriculum (Krashen, 2014). In the face of such praise and criticism, it was uncertain what the future of the Common Core would be and how it would affect the instruction of American students.

Summary

In the review of the literature, the researcher observed several commonalities among top performing countries. In most of the high performing countries, teachers enjoyed a status equal to that of a doctor or lawyer, and teachers were recruited from the top graduates. Teacher education programs were often more rigorous than those in the

U.S., and teachers in top performing countries were often shown great respect and autonomy. Another common theme among high performers was the reform movement to decentralization, which is in opposition to the recent American movement of centralization. On the other hand, like the recent push for a national curriculum in the U.S., many high performers also had a national curriculum. Unlike that of the U.S., however, the national curricula were often broad, and many decisions were left to local districts. Another difference existed in the amount of standardized testing in different nations, with some high performers requiring no standardized testing and others with varying amounts.

The subsequent research aims to build on the then-current research by analyzing the relationship between school factors and student achievement and the differences in school factors between the U.S. and top performing countries. The researcher believes a study of the school factors measured by the TALIS and their relationship to student achievement will aid the U.S. in enacting policy changes designed to improve student achievement in the U.S. Chapter Three explained the method of data collection and analysis utilized to address the hypotheses. In Chapter Four the results of the data analysis were summarized. Tables were presented to represent the relationships between factors of school working conditions and learning environments as well as differences between the U.S. and the other selected countries within factors of school working conditions and learning environments significant to student achievement. Finally, in Chapter Five the researcher interpreted the results in the context of literature current at the time of this writing, provided suggestions to policymakers and educators, and made recommendations for further study.

Chapter Three: Methodology

This study utilized secondary data from the 2012 PISA and 2013 TALIS regarding student achievement and teaching and learning factors. The purpose of this study was to determine possible differences and relationships among research supported factors of teaching and learning that contributed to international student achievement. The methodology of this study was shaped by the design and implementation of the PISA and TALIS, as regulated by the OECD. The researcher determined how the data collected by the OECD would be presented and used based on the hypotheses of the study.

Null Hypotheses

The null hypotheses analyzed in this study were as follows:

H_1: There is no relationship between the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS and reading achievement measured by the PISA among the selected countries: United States, Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

The researcher selected components from the factors of school working conditions and learning environments that aligned with research-based educational practices. Then, to determine whether or not there was a relationship between the factors of school working conditions and learning environments and student achievement, a Pearson Product Moment Correlation analysis was conducted for each selected component of the factors of school working conditions and learning environments and the

selected countries' reading achievement scores on the PISA. Finally, a *t*-test was utilized to test the significance of the correlation coefficient.

H_2: There is no difference in the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS between the United States and the other selected countries: Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

For each component of the TALIS that demonstrated a significant relationship to student achievement, a *z*-test for difference in proportions was performed to determine if differences existed between the U.S. and each of the other selected countries.

Variables and Measures

This study used the 2012 PISA overall reading scores available at the OECD website. In particular, scores were obtained for the U.S., Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia. Additionally, the researcher used data from the 2013 TALIS also available at the OECD website. Datasets were extracted for teacher-level and principal-level surveys for the U.S., Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia. In each of the country's teacher-level and principal-level datasets, the researcher studied the individual factors of initial teacher education and professional development; teacher appraisal and feedback; and school climate. The principal-level

dataset was also used to study school leadership, while the teacher-level dataset was also used to study teachers' instructional beliefs and pedagogical practices.

Measuring Tools

PISA. The PISA was launched in 1997 to provide cross-national, comparable evidence of student performance and monitor the outcomes of education systems within an internationally-agreed common framework (OECD, 2013b). By assessing the abilities of 15-year-old students to apply their knowledge in the key subjects of reading, mathematics, and science to real-world situations, the PISA aimed to provide a foundation for countries to engage in policy dialogue and collaborate on educational goals (OECD, 2013b). To provide high quality instruments and superior levels of validity and reliability, the PISA framework utilized the following: systematic means for translation, sampling, and administering the assessment; measures to promote cultural and linguistic coverage in the assessment items through countries' participation in the development of test items through local item paneling, cognitive interviews with students, local pilot testing, international item paneling, international pilot testing, national item submissions, national item review, international item review, preparation of dual source versions, and field testing in all participating countries; and sophisticated technology and methodology for handling and analyzing data (OECD, 2013b, 2014d).

TALIS. In 2008, the first TALIS was implemented to determine how countries could prepare teachers to face the unique challenges in schools (OECD, 2014b). The purpose of the TALIS was to provide internationally-comparable information to assist countries in executing policies that would support and develop a high-quality teaching profession (2014f). The OECD ensured high reliability and validity of the 2013 TALIS in

several ways. Development of the TALIS was guided by a clear conceptual framework that included goals, themes, and constructs, in addition to maximum country input and extensive consultations with experts in the thematic areas, and in questionnaire and sample design (OECD, 2014g). Additionally, instrument development and validation occurred in several stages, including a pilot study and a field trial, which allowed the survey developers to test the survey instruments and operational procedures, determine the cross-cultural validity of measures, and make revisions and plans for each subsequent phase (OECD, 2014g).

PISA Sampling Process

The OECD managed the PISA with specific procedures from which each country was expected to adhere. PISA aimed to measure a nationally representative sample of 15-year-old students, because this age marked the end of compulsory education in many OECD countries (Bulle, 2011). Although 15 was the target age, the technical standards specified that students had to be between 15 years and 3 months to 16 years and 2 months at the beginning of the assessment period (National Center for Education Statistics, 2015a). In order to select students in a representative way, the PISA utilized a stratified sample design. In the first stage of sampling, In the first stage of sampling, each country grouped their schools into explicit strata that would be treated independently of each other, such as states or regions of a country (OECD, 2014d). Then, each country sorted the schools within each explicit stratum into implicit stratification variables such as type of school, degree of urbanization, and minority composition (OECD, 2014d). After schools were stratified, schools were systematically sampled from a list of all PISA-

eligible schools, with probabilities that were proportional to the number of eligible 15 year old students in the school (OECD, 2014d).

In the second stage of sampling, a complete list of eligible students was prepared for each of the selected schools, and a specified number of students (usually 35 students) were selected with equal probability from this list using the PISA Consortium KeyQuest sampling software (OECD, 2014d). Total sample sizes differed based on the size of the country, but a typical sample size was between 4,500 and 10,000 students (Merry, 2013), with 4,500 students and 150 schools as the minimum number for students and schools, respectively (National Center for Education Statistics, 2015a, para. 2). In order to be included in the data reported by the OECD, nations were required to have 65% school participation rates and 80% student participation rates (National Center for Education Statistics, 2015a, para. 4-5). A total of about 510,000 students completed the PISA in 2012. Refer to Table 1 for individual country figures.

Table 1

PISA Student Participation by Country

Country	n
Singapore	5,546
Japan	6,351
Korea	5,033
Finland	8,829
Poland	5,662
Czech Republic	6,535
Italy	38,142
Latvia	5,276
Portugal	5,722
Spain	25,335
Romania	5,074
Bulgaria	5,282
Mexico	33,806
Brazil	20,091
Malaysia	5,197
United States	6,111

Note: n = number of students who completed the PISA. From OECD, 2014d.

TALIS Sampling Process

Although TALIS and PISA were both developed and regulated by the OECD, they were not specifically linked. However, in the 2013 TALIS, countries that took part in the 2012 PISA could choose to give the TALIS to their 2012 PISA schools. From the list of countries in this study, Finland, Singapore, Spain, Portugal, Mexico, Romania, and Latvia chose to use the same schools in both the 2012 PISA and the 2013 TALIS (OECD, 2014g). Additionally, while all participating countries administered surveys to lower secondary principals and teachers (the focus of this research), countries could choose to survey primary and upper secondary principals and teachers. From the list of countries included in this study, Finland, Mexico, and Poland chose to additionally survey primary and upper secondary principals and teachers, and Italy and Singapore chose to additionally survey upper secondary principals and teachers (OECD, 2014g).

Table 2

TALIS Principal Participation by Country

Country	n
Singapore	159
Japan	192
Korea	177
Finland	146
Poland	195
Czech Republic	220
Italy	194
Latvia	116
Portugal	185
Spain	192
Romania	197
Bulgaria	197
Mexico	187
Brazil	1,070
Malaysia	150
United States	122

Note: n = number of principals who completed the TALIS. From OECD, 2014f.

In order to ensure accurate representation, countries were required to sample at least 200 schools. From each of the 200 schools, the school principal and up to 22 teachers were asked to complete the survey (National Center for Education Statistics, 2015b). Applicable teachers were randomly selected from a list of randomly selected schools (OECD, 2014g). The number of participating lower secondary principals included in this study are represented in Table 2.

The number of participating lower secondary teachers for each of the countries included in this study are represented in Table 3.

Table 3

TALIS Teacher Participation by Country

Country	n
Singapore	3,109
Japan	3,484
Korea	2,933
Finland	2,739
Poland	3,858
Czech Republic	3,219
Italy	3,337
Latvia	2,126
Portugal	3,628
Spain	3,339
Romania	3,286
Bulgaria	2,975
Mexico	3,138
Brazil	14,291
Malaysia	2,984
United States	1,926

Note: n = number of teachers who completed the TALIS. From OECD, 2014f.

Data Selection Process

The TALIS was developed to measure the factors of initial teacher education and professional development, teacher appraisal and feedback, school climate, school leadership, and teachers' instructional beliefs and pedagogical practices (OECD, 2014h).

To allow for a deeper understanding of each factor, or category, from the TALIS, individual subcategories were chosen for the principal survey (see Table 4). Based on these categories, the researcher classified questions into secondary and, if necessary, tertiary categories.

As with the TALIS principal survey, individual subcategories were chosen for the TALIS teacher survey from the factors of initial teacher education and professional development, teacher appraisal and feedback, school climate, school leadership, and teachers' instructional beliefs and pedagogical practices (see Table 5). The researcher classified the questions from the teacher survey into the selected secondary and tertiary categories within each factor.

In the first stage of this study, the researcher reviewed the work of Marzano (2003, 2006, 2007) and Hattie (2009, 2012) in order to align TALIS components from the chosen categories and subcategories to research-based educational practices. Components of the TALIS principal survey that aligned to this educational research were selected for further analysis (see Table 6).

Components of the TALIS teacher survey that aligned to the educational research of Hattie (2009, 2012) and Marzano (2003, 2006, 2007) were additionally selected for further analysis (see Table 7). Each of the selected components displayed in Table 4 through Table 7 were studied independently to determine possible relationships between teaching and learning factors and student achievement.

Table 4

Categories for TALIS Principal Questionnaire

Primary	Secondary	Tertiary
Initial Teacher Education and Professional Development	Induction Program	Access to Induction Program Teachers Offered Induction Program Structures/Activities Included in Induction Program
	Mentoring System	Access to Mentoring System Alignment of Subject Field Between Mentor and Mentee Importance of Mentoring Purposes
Teacher Appraisal and Feedback	Frequency of Formal Appraisal by Stakeholders Tasks Performed by Participating Members in Formal Appraisal Outcomes Resulting from Formal Appraisal	
School Climate	Collaboration among Staff, Students, and the Community Issues Hindering Quality Instruction Frequency of Misbehavior by Students Frequency of Tardiness, Absences, and Discrimination by Teachers Job Satisfaction Student- Teacher Relationships	

Table 4

Categories for TALIS Principal Questionnaire - Continued

School Leadership	Background Information	Highest Level of Formal Education Years of Work Experience Current Employment Status Principal Professional Development Activities Barriers to Professional Development as a Principal
	School Management Team	Existence of a School Management Team School Management Team Members
	School Tasks	Who Has Responsibility of Tasks Percentage of Time Spent in School Tasks Engagement in Tasks Related to Student Evaluation Results and the Development of a Professional Development Plan Frequency of School Tasks Participation of Other School Members in School Tasks
	School Governing Board	Presence and Composition of School Governing Board
	Parent/Guardian Involvement	Opportunities/Services Provided to Parents or Guardians
	Barriers to Effectiveness	Limiting Factors to Effectiveness as Principal

Table 5

Categories for TALIS Teacher Questionnaire

Primary	Secondary	Tertiary
Initial Teacher Education and Professional Development	Formal Education or Training	Highest Level of Formal Education Completion of Teacher Education or Training Program Elements of Formal Education or Training Feeling of Preparedness Subjects Included in Formal Education or Training
	Professional Development	Participation in Induction Program Participation in Mentoring Program Participation in Professional Development Activities in the Last 12 Months Positive Impact of Professional Development Activities Support for Professional Development Activities Type of Professional Development Activities Need for Areas of Professional Development Barriers to Professional Development
Teacher Appraisal and Feedback	Methods of Feedback	Source of Feedback Method by Which Stakeholders Offer Feedback Areas of Emphasis on Feedback Feedback Procedures
	Positive Changes Resulting from Feedback	

Table 5

Categories for TALIS Teacher Questionnaire – Continued

School Climate	Collaboration among Staff, Students, and the Community Student- Teacher Relationships Job Satisfaction	
Teachers' Instructional Beliefs and Pedagogical Practices	Teachers' Personal Beliefs on Teaching and Learning Collaboration with Other Teachers Instructional and Behavioral Strategies	Teachers' Self-Efficacy Distribution of Class Time Instructional Strategies Used Teachers' Use of Assessment Practices

Table 6

Question Selection from TALIS Principal Questionnaire

Primary Category	Subcategory	Selected Question(s)	Supporting Research
Teacher Appraisal and Feedback	Frequency of Formal Appraisal by Stakeholders	Question 27 (a- e)	Marzano, R. J., & Toth, M. (2013)
	Tasks Performed by Participating Members in Formal Appraisal	Question 28 (a- f)	Marzano, R. J., Frontier, T., & Livingston, D. (2011)
	Outcomes Resulting from Formal Appraisal	Question 29 (a- d)	Marzano, R. J., Frontier, T., & Livingston, D. (2011)
School Climate	Collaboration among Staff, Students, and the Community	Question 22 (a- e) Question 25 (a- d) Question 30 (a- e)	Marzano, R. J. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
	Student-Teacher Relationships	Question 30 (f)	Hattie, J. (2009); Marzano, R. J., Marzano, J. S., & Pickering, D. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005); Marzano, R. J. (2007)

Table 6

Question Selection from TALIS Principal Questionnaire - Continued

School Leadership	Percentage of Time Spent in School Tasks	Question 19 (a- f)	Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
	Engagement in Tasks Related to Student Evaluation Results and the Development of a Professional Development Plan	Question 20 (a- b)	Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
	Frequency of School Tasks	Question 21 (a- i)	Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
		Question 23	Marzano, R. J. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
	Presence and Composition of School Governing Board	Question 24 (a- i)	Marzano, R. J. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005)

Table 7

Question Selection from TALIS Teacher Questionnaire

Primary Category	Subcategory	Selected Question(s)	Supporting Research
Initial Teacher Education and Professional Development	Participation in Professional Development Activities in the Last 12 Months	Question 21 (c)	Hattie, J. (2009)
	Positive Impact of Professional Development Topics	Question 22 (b)	Marzano, R. J. (2003)
	Structure of Professional Development Activities	Question 25 (a-d)	Marzano, R. J. (2003)
Teacher Appraisal and Feedback	Method by Which Stakeholders Offer Feedback	Question 28 (a- f)	Marzano, R. J., Frontier, T., & Livingston, D. (2011); Marzano, R. J., & Toth, M. (2013)
	Areas of Emphasis on Feedback	Question 29 (a- k)	Marzano, R. J., Frontier, T., & Livingston, D. (2011)
	Feedback Procedures	Question 31 (a- h)	Marzano, R. J., Frontier, T., & Livingston, D. (2011)
School Climate	Collaboration among Staff, Students, and the Community	Question 44 (a- e)	Marzano, R. J. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005)
	Student-Teacher Relationships	Question 45 (a- d)	Hattie, J. (2009); Marzano, R. J., Marzano, J. S., & Pickering, D. (2003); Marzano, R. J., Waters, T., & McNulty, B. A. (2005); Marzano, R. J. (2007)
	Job Satisfaction	Question 46 (a- j)	Marzano, R. J. (2003)

Table 7

Question Selection from TALIS Teacher Questionnaire - Continued

Teachers' Instructional Beliefs and Pedagogical Practices	Teachers' Personal Beliefs on Teaching and Learning	Question 32 (a- d)	Hattie, J. (2009); Hattie, J. (2012); Marzano, R. J. (2007); Marzano, R. J., Pickering, D., & Pollock, J. E. (2001)
	Teachers' Self- Efficacy	Question 34 (a- l)	Hattie, J. (2012).
	Distribution of Class Time	Question 39 (a- c)	Hattie, J. (2009); Hattie, J. (2012); Marzano, R. J., Marzano, J. S., & Pickering, D. (2003)
	Teachers' Use of Assessment Practices	Question 43 (a- f)	Hattie, J. (2009); Hattie, J. (2012); Marzano, R.J. (2006); Marzano, R.J. (2007). Marzano, R. J., Marzano, J. S., & Pickering, D. (2003); Marzano, R. J., Pickering, D., & Pollock, J. E. (2001).

Data Analysis

The researcher initially conducted a Pearson Product Moment Correlation to determine a possible relationship between the selected factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS and reading achievement measured by the PISA. Then, to determine if the correlation coefficient was significant, the researcher performed a *t*-test. Where significant relationships between teaching and learning factors and student achievement existed, a *z*-test for difference in proportions was performed to determine if there was a difference in the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Summary

The data utilized in this research was based on the 2012 PISA and 2013 TALIS and obtained from the OECD website. Data was extracted for each of the following countries: U.S., Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia. The hypotheses of this study sought to determine if there were differences and/or relationships among research-based factors of teaching and learning and international student achievement. To

test the hypotheses, the researcher used reading achievement scores from the 2012 PISA and reviewed the work of Marzano (2003, 2006, 2007) and Hattie (2009, 2012) to select research-based components of teaching and learning from the 2013 TALIS. After the selection of categories and specific questions from the TALIS, a Pearson Product Moment Correlation analysis was performed to determine if there was a relationship between each of the selected components and student achievement. Then, for each component that was significantly related to student achievement, a *z*-test for difference in proportions was performed to determine if differences existed between the U.S. and each of the other selected countries. Chapter Four presents the results of these analyses, while Chapter Five presents interpreted results and made recommendations for educational leaders and future studies.

Chapter Four: Results

Overview

The researcher conducted the analyses in this chapter to determine possible differences and relationships among research-supported factors of school working conditions and learning environments that contributed to international student achievement. The first part of this chapter presents an analysis of the relationship between international student achievement and factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices). The second part of this chapter presents analysis of possible differences in school working conditions and learning environments between the U.S. and the top five, middle five, and lowest five performing countries measured by PISA scores.

The Relationship between Student Achievement and Factors of School Working Conditions and Learning Environments

The hypothesis analyzed in this section was as follows:

H_1: There is no relationship between the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS and reading achievement measured by the PISA among the selected countries: United States, Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Initial teacher education and professional development. The first factor of school working conditions and learning environments analyzed was initial teacher education and professional development. Utilizing the research of Marzano (2003, 2006, 2007) and Hattie (2009, 2012), the researcher selected three items from the teacher survey for analysis. Question 21 of the teacher survey, 'During the last 12 months, did you participate in any of the following professional development activities, and if yes, for how many days did they last?' with specific response selection, 'c) observation visits to other schools,' was analyzed for a possible relationship between student achievement and professional development under the tertiary category participation in professional development activities in the last 12 months. Based on a *t*-test for significance of the correlation coefficient, the null hypothesis was not rejected for participation in observation to other schools, but it was rejected for the average days spent in observation visits to other schools (see Table 8). The researcher found a relationship between the average days spent in observation visits to other schools and student achievement.

Question 22 of the teacher survey, 'Did the professional development activities you participated in during the last 12 months cover the following topics? If so, what positive impact did these have on your teaching?' with specific response selection, 'b) pedagogical competencies in teaching my subject field(s),' was analyzed for a possible relationship between student achievement and professional development under the tertiary category of positive impact of professional development topics. In each part of the question, teachers selected whether the topic was covered in their professional development and whether it had 'no' impact, a 'small' impact, a 'moderate' impact, or a 'large' impact. The question was analyzed based on the percentage of teachers who

reported the topic had been covered and that the topic had a ‘moderate’ or ‘large’ impact on their teaching. A *t*-test for significance of the correlation coefficient demonstrated no significance for either of the tested variables (see Table 8). The null hypothesis was not rejected for either variable. The researcher found no relationship between student achievement and professional development regarding pedagogical teaching competencies under the tertiary category of positive impact of professional development topics.

Question 25 of the teacher survey, ‘Considering the professional development activities you took part in during the last 12 months, to what extent have they included the following?’ with possible response selections, ‘a) a group of colleagues from my school or subject group,’ ‘b) opportunities for active learning methods (not only listening to a lecturer),’ ‘c) collaborative learning activities or research with other teachers,’ and ‘d) an extended time- period (several occasions spread out over several weeks or months),’ was analyzed for a possible relationship between student achievement and professional development under the tertiary category of structure of professional development activities. In each part of the question, teachers selected whether the structures were included ‘not in any activities,’ ‘yes, in some activities,’ ‘yes, in most activities,’ or ‘yes, in all activities.’ The researcher analyzed this question based on the percentage of teachers who reported their professional development and included those structures in ‘most’ or ‘all’ of their activities. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the four variables (see Table 8). The null hypothesis was not rejected for any variable. The researcher found no relationship between student achievement and the four variables selected under the tertiary category of positive impact of structure of professional development activities.

Table 8

Correlations Between Professional Development and Student Achievement

Variables	*r*	*p*
Participation in professional development activities in the last 12 months		
Participation in observation visits to other schools	0.311	0.2410
Average days spent in observation visits to other schools	-0.515	0.0412
Positive impact of professional development topics		
Participation in professional development on pedagogical competencies in teaching subject field(s)	0.206	0.4440
Moderate or large impact on teaching after participation in professional development on pedagogical competencies in teaching subject field(s)	-0.383	0.1431
Structure of professional development activities		
A group of colleagues from the school or subject group	-0.400	0.1431
Opportunities for active learning methods (not only listening to a lecturer)	-0.273	0.3063
Collaborative learning activities or research with other teachers	-0.451	0.0795
An extended time period (several occasions spread out over several weeks or months)	-0.298	0.2623

Note: $p \leq 0.05$

Teacher appraisal and feedback. The second factor of school working conditions and learning environments considered for analysis was teacher appraisal and feedback. Utilizing the research of Marzano (2003, 2006, 2007) and Hattie (2009, 2012), the researcher selected six questions from the principal and teacher survey for analysis. Question 27 of the principal survey, ‘On average, how often is each teacher formally appraised in this school by the following people?’ with possible response selections, ‘a) you, as principal,’ ‘b) other members of the school management team,’ ‘c) assigned mentors,’ ‘d) teachers (who are not part of the school management team),’ and ‘e)

external individuals or bodies (e.g. inspectors, municipality representatives, districts/jurisdictions office personnel, or other persons from outside the school),' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the secondary category of frequency of formal appraisal by stakeholders. In each part of the question, principals selected either 'never,' 'less than once every two years,' 'once every two years,' 'once per year,' or 'twice or more per year.' The question was analyzed based on the percentage of principals who reported 'twice or more per year.' A *t*-test for significance of the correlation coefficient demonstrated significance for three of the five variables (see Table 9). The null hypothesis was not rejected for teacher appraisal by the other members of the school management team twice or more per year and teacher appraisal by the assigned mentor twice or more per year. The null hypothesis was rejected for teacher appraisal by the principal twice or more per year (*p*-value: 0.0512), teacher appraisal by other teachers twice or more per year (*p*-value: 0.0390), and teacher appraisal by external individuals or bodies twice or more per year (*p*-value: 0.0031). The researcher found a relationship between student achievement and the following variables: teacher appraisal by the principal twice or more per year, teacher appraisal by other teachers twice or more per year, and teacher appraisal by external individuals or bodies.

Question 28 of the principal survey, 'Who performs the following tasks as part of the formal appraisal of teachers' work in this school?' with possible response selections, 'a) direct observation of classroom teaching,' 'b) student surveys about teaching,' 'c) assessments of teachers' content knowledge,' 'd) analysis of students' test scores,' 'e) discussion of teachers' self-assessments of their work (e.g. presentation of a portfolio

assessment),' 'f) discussion about feedback received by parents or guardians,' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the secondary category of tasks performed by participating members in formal appraisal. In each part of the question, principals selected as many of the following choices as appropriate, 'external individuals or bodies,' 'you, as a principal,' 'member(s) of school management team,' 'assigned mentors,' 'other teachers (not part of the management team),' and/or 'not used in this school.' The researcher chose to analyze the question in two different ways: the method of appraisal used by the school principal and the method of appraisal used generally by any of the stakeholders. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables (see Table 9), and the null hypothesis was not rejected for any variable. The researcher found no relationship between student achievement and the variables selected under the secondary category of tasks performed by participating members in formal appraisal.

Question 29 of the principal survey, 'Please indicate the frequency that each of the following occurs in this school following a teacher appraisal,' with possible response selections, 'a) measures to remedy any weaknesses in teaching are discussed with the teacher,' 'b) a development or training plan is developed for each teacher,' and 'd) a mentor is appointed to help the teacher improve his/her teaching,' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the secondary category of outcomes resulting from formal appraisal. In each part of the question, principals selected either 'never,' 'sometimes,' 'most of the time,' or 'always.'

Table 9

Correlations Between Teacher Appraisal and Feedback and Student Achievement (Principal Survey)

Variables	*r*	*p*
Frequency of formal appraisal by stakeholders		
School principal	-0.495	0.0512
Other members of the school management team	-0.293	0.2708
Assigned mentor	-0.367	0.1620
Other teachers	-0.520	0.0390
External individuals or bodies	-0.690	0.0031
Tasks performed by participating members in formal appraisal (principal only)		
Direct observation of classroom teaching	0.145	0.5921
Student surveys about teaching	-0.275	0.3026
Assessment of teachers' content knowledge	0.125	0.6446
Analysis of student test scores	-0.271	0.3100
Discussion of teachers' self-assessments of their work	0.146	0.5895
Discussion about feedback received from parents or guardians	0.090	0.7403
Tasks Performed by participating members in formal appraisal		
Direct observation of classroom teaching	-0.111	0.6824
Student surveys about teaching	-0.018	0.9472
Assessment of teachers' content knowledge	-0.332	0.2090
Analysis of student test scores	-0.284	0.2864
Discussion of teachers' self-assessments of their work	-0.068	0.8024
Discussion about feedback received from parents or guardians	-0.169	0.5315
Outcomes resulting from formal appraisal		
Measures to remedy any weaknesses in teaching are discussed with the teacher	-0.507	0.0450
A development or training plan is developed for each teacher	-0.343	0.1934
A mentor is appointed to help the teacher improve his/her teaching	-0.221	0.4108

Note: $p \leq 0.05$

The researcher analyzed the question based on the percentage of principals who reported that the outcomes happen 'most of the time.' A *t*-test for significance of the correlation coefficient demonstrated significance for one of the three variables (see Table 9). The null hypothesis was not rejected for two outcomes of teacher appraisal: 'a development or training plan is developed for each teacher' and 'a mentor is appointed to help the teacher improve his/her teaching.' The null hypothesis was rejected for the outcome that 'measures to remedy any weaknesses in teaching are discussed with the teacher (*p*-value: 0.0450).' The researcher found a relationship between student achievement and selection response the teacher appraisal outcome that 'measures to remedy any weaknesses in teaching are discussed with the teacher.'

Question 28 of the teacher survey, 'In this school who uses the following methods to provide feedback to you?' with possible response selections, 'a) feedback following direct observation of your classroom teaching,' 'b) feedback from student surveys about your teaching,' 'c) feedback following an assessment of your content knowledge,' 'd) feedback following an analysis of your students' test scores,' 'e) feedback following your self-assessment of your work,' 'f) feedback following surveys or discussions with parents or guardians,' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the tertiary category of method by which stakeholders offer feedback. In each part of the question, teachers selected as many of the following choices as appropriate 'external individuals or bodies,' 'school principal,' 'member(s) of school management team,' 'assigned mentors,' 'other teachers (not part of the management team),' and/or 'I have never received this feedback in this school.' The researcher chose to analyze the question in three different ways: the source of feedback,

the method of feedback utilized by the school principal and the method of feedback used generally by any of the stakeholders. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables except for one (see Table 10), and the null hypothesis was only rejected for one variable - other teachers as the source of feedback. The researcher found a relationship between student achievement and other teachers as the source of feedback.

Question 29 of the teacher survey, 'In your opinion, when you receive this feedback, what is the emphasis placed on in the following areas?' with possible response selections, 'a) student performance,' 'b) knowledge and understanding of my subject field(s),' 'c) pedagogical competencies in teaching my subject fields,' 'd) student assessment practices,' 'e) student behavior and classroom management,' 'f) teaching of students with special needs,' 'g) teaching in a multicultural or multilingual setting,' 'h) the feedback I provide to other teachers to improve their teaching,' 'i) feedback from parents or guardians,' 'j) student feedback,' and 'k) collaboration or working with other teachers,' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the tertiary category of areas of emphasis on feedback. In each part of the question, teachers selected either 'not considered at all,' 'considered with low importance,' 'considered with moderate importance,' or 'considered with high importance.' The researcher analyzed the question based on the percentage of teachers who reported feedback was emphasized with 'moderate' or 'high' importance. A *t*-test for significance of the correlation coefficient demonstrated significance for three of the 11 tested variables (see Table 10).

Table 10

Correlations Between Teacher Appraisal and Feedback and Student Achievement (Teacher Survey)

Variables	*r*	*p*
Source of Feedback		
External individuals or bodies	-0.470	0.0662
School principal	-0.125	0.6446
Members of school management team	-0.305	0.2507
Assigned mentor	-0.224	0.4043
Other teachers	0.490	0.0540
Never received feedback in current school	0.169	0.5315
Method by which stakeholders offer feedback (principals only)		
Feedback following classroom observation	-0.091	0.7375
Feedback from student surveys	-0.356	0.1760
Feedback following assessment of teachers' content knowledge	-0.238	0.3747
Feedback following analysis of student test scores	-0.446	0.0834
Feedback following self-assessment of teachers' work	-0.038	0.8889
Feedback from surveys or discussion with parents	-0.298	0.2623
Method by which stakeholders offer feedback		
Feedback following classroom observation	-0.133	0.6234
Feedback from student surveys	-0.299	0.2606
Feedback following assessment of teachers' content knowledge	0.330	0.2119
Feedback following analysis of student test scores	-0.422	0.1035
Feedback following self-assessment of teachers' work	-0.112	0.6796
Feedback from surveys or discussion with parents	-0.389	0.1364

Table 10
Correlations: Teacher Appraisal and Feedback and Student Achievement - Continued

Areas of emphasis on feedback		
Student performance	-0.594	0.0153
Knowledge and understanding of subject field	-0.459	0.0737
Pedagogical competencies in teaching subject field	-0.281	0.2918
Student assessment practices	-0.430	0.0964
Student behavior and classroom management	-0.329	0.2134
Teaching of students with special needs	0.074	0.7853
Teaching in a multicultural or multilingual setting	-0.557	0.0250
The feedback I provide to other teachers to improve their teaching	-0.500	0.0486
Feedback from parents or guardians	-0.378	0.1489
Student feedback	-0.385	0.1409
Collaboration or working with other teachers	-0.419	0.1062
Feedback Procedures		
The best performing teachers in this school received the greatest recognition	-0.114	0.6742
Teacher appraisal and feedback have little impact upon the way teachers teach in the classroom	0.189	0.4833
Teacher appraisal and feedback are largely done to fulfill administrative requirements	0.099	0.7153
A development or training plan is established to improve their work as a teacher	-0.400	0.1248
Feedback is provided to teachers based on a thorough assessment of their teaching *	-0.346	0.2065
If a teacher is consistently underperforming, he/she would be dismissed *	-0.185	0.5092
Measures to remedy any weaknesses in teaching are discussed with the teacher	-0.410	0.1147
A mentor is appointed to help teachers improve his/her teaching	-0.474	0.0636

Note: $p \leq 0.05$. *Data was not available for Italy for these categories

The null hypothesis was rejected for three variables: teacher feedback that emphasized student performance (*p*-value: 0.0153), teacher feedback that emphasized teaching in a multicultural or multilingual setting (*p*-value: 0.0250), and teacher feedback that emphasized the feedback teachers provide to other teachers to improve their teaching (*p*-value: 0.0486). The researcher found a relationship between student achievement and teacher feedback that emphasized student performance, teaching in multicultural or multilingual setting, and the feedback teachers provide to other teachers to improve their teaching.

Question 31 of the teacher survey, 'We would now like to ask you about teacher appraisal and feedback in this school more generally. How strongly do you agree or disagree with the following statements about this school?' with possible response selections, 'a) the best performing teachers in this school receive the greatest recognition (e.g. rewards, additional training or responsibilities),' 'b) teacher appraisal and feedback have little impact upon the way teachers teach in the classroom,' 'c) teacher appraisal and feedback are largely done to fulfill administrative requirements,' 'd) a development or training plan is established for teachers to improve their work as a teacher,' 'e) feedback is provided to teachers based on a thorough assessment of their teaching,' 'f) if a teacher is consistently under-performing, he/she would be dismissed,' 'g) measures to remedy any weaknesses in teaching are discussed with the teacher,' and 'h) a mentor is appointed to help the teacher improve his/her teaching,' was analyzed for a possible relationship between student achievement and teacher feedback and appraisal under the tertiary category of feedback procedures. For each part of the question, teachers selected either 'strongly disagree,' 'disagree,' 'agree,' or 'strongly agree.' The researcher analyzed the

data based on the percentage of teachers who agreed or strongly agreed with each feedback procedure. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables (see Table 10), and the null hypothesis was not rejected for any variables. The researcher found no relationship between student achievement and any of the tested variables under the tertiary category of feedback procedures.

School climate. The third factor of school working conditions and learning environments considered for analysis was school climate. The researcher selected six questions from the principal and teacher surveys for analysis based on the research of Marzano (2003, 2006, 2007) and Hattie (2009, 2012).

Question 22 of the principal survey, 'How strongly do you agree or disagree with these statements as applied to this school?' with possible response selections, 'a) this school provides staff with opportunities to actively participate in school decisions,' 'b) this school provides parents or guardians with opportunities to actively participate in school decisions,' 'c) this school provides students with opportunities to actively participate in school decisions,' 'd) I make the important decisions on my own,' and 'e) there is a collaborative school culture which is characterized by mutual support,' was analyzed for a possible relationship between student achievement and school climate under the secondary category of collaboration among staff, students, and the community. For each part of the question, teachers selected if they 'strongly disagree,' 'disagree,' 'agree,' or 'strongly agree.' The researcher analyzed the data based on the percentage of teachers who agreed or strongly agreed with each statement. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables

(see Table 11). The null hypothesis was not rejected for any variables, and the researcher found no relationship between student achievement and any of the tested variables under the secondary category of collaboration among staff, students, and the community.

Question 25 of the principal survey, 'During this school year, does this school provide any of the following to parents or guardians?' with possible response selections, 'a) workshops or courses for parents or guardians,' 'b) services to support parents' or guardians' participation, such as providing child care,' 'c) support for parental association (s),' and 'd) parental meeting(s),' was analyzed for a possible relationship between student achievement and school climate under the secondary category of collaboration among staff, students, and the community. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables (see Table 11), and the null hypothesis was not rejected for any variables. The researcher found a relationship between student achievement and any of the tested variables under the secondary category of collaboration among staff, students, and the community.

Question 30 of the principal survey, 'How strongly do you agree or disagree with these statements as applied to this school?' with possible response selections, 'a) the school staff share a common set of beliefs about schooling/learning,' 'b) There is a high level of cooperation between the school and the local community,' 'c) school staff have an open discussion about difficulties,' 'd) there is mutual respect for colleagues' ideas,' and 'e) there is a culture of sharing success,' was analyzed for a possible relationship between student achievement and school climate under the secondary category of collaboration among staff, students, and the community.

Table 11

Correlations Between School Climate Factors and Student Achievement (Principal Survey)

Variables	*r*	*p*
Collaboration among staff, students, and the community		
This school provides staff with opportunities to actively participate in school decisions	0.371	0.1572
This school provides parents or guardians with opportunities to actively participate in school decisions	-0.421	0.1044
This school provides students with opportunities to actively participate in school decisions	0.005	0.9853
I make important decisions on my own	0.162	0.5489
There is a collaborative school culture that which is characterized by mutual support	0.211	0.4328
Workshops or courses are offered for parents or guardians	0.320	0.2269
Services are offered to support parents' or guardians' participation, such as providing child care	0.058	0.8310
Support for parental association(s) is provided to parents or guardians	0.140	0.6051
Parental meeting(s) are provided to parents or guardians	0.236	0.3789
The school staff share a common set of beliefs about schooling/learning	0.632	0.0086
There is a high level of co-operation between the school and the local community	-0.033	0.9034
School staff have an open discussion about difficulties	0.094	0.7291
There is mutual respect for colleagues' ideas	0.222	0.4086
There is a culture for sharing success	-0.044	0.8715
Student-teacher relationships		
The relationships between teachers and students are good	0.422	0.1035

Note: $p \leq 0.05$

Additionally, Question 30 specific response selection, ‘f) the relationships between teachers and students are good,’ was analyzed for a possible relationship between student achievement and school climate under the secondary category of student-teacher relationships. A *t*-test for significance of the correlation coefficient demonstrated significance for one of the tested variables (see Table 11). The null hypothesis was rejected for the characteristic that ‘the school staff share a common set of beliefs about schooling/learning (*p*-value: 0.0086).’ The researcher found a relationship between student achievement and the characteristic that ‘the school staff share a common set of beliefs about schooling/learning’ under the secondary category of collaboration among staff, students, and the community.

Question 44 of the teacher survey, ‘How strongly do you agree or disagree with these statements as applied to this school?’ with possible response selections, ‘a) this school provides staff with opportunities to actively participate in school decisions,’ ‘b) this school provides parents or guardians with opportunities to actively participate in school decisions,’ ‘c) this school provides students with opportunities to actively participate in school decisions,’ ‘d) this school has a culture of shared responsibility for school issues,’ and ‘e) there is a collaborative school culture which is characterized by mutual support,’ was analyzed for a possible relationship between student achievement and school climate under the secondary category of collaboration among staff, students, and the community. For each part of the question, teachers selected if they ‘strongly disagree,’ ‘disagree,’ ‘agree,’ or ‘strongly agree.’ The researcher analyzed the data based on the percentage of teachers who agreed or strongly agreed with each statement. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the

tested variables (see Table 12). The null hypothesis was not rejected for any variables, and the researcher found no relationship between student achievement and any of the tested variables under the secondary category of collaboration among staff, students, and the community.

Question 45 of the teacher survey, 'How strongly do you agree or disagree with the following statements about what happens in this school?' with possible response selections, 'a) in this school, teachers and students usually get on well with each other,' 'b) most teachers in this school believe that the students' well-being is important,' 'c) most teachers in this school are interested in what students have to say,' and 'd) if a student from this school needs extra assistance, the school provides it,' was analyzed for a possible relationship between student achievement and school climate under the secondary category of student-teacher relationships. For each part of the question, teachers selected if they 'strongly disagree,' 'disagree,' 'agree,' or 'strongly agree.' The researcher analyzed the data based on the percentage of teachers who agreed or strongly agreed with each statement. A *t*-test for significance of the correlation coefficient demonstrated significance for one of the four tested variables (see Table 12), and the null hypothesis was rejected for teachers' interest in what students have to say (*p*-value: 0.0142). The researcher found a relationship between student achievement and teachers' interest in what students have to say under the secondary category of teacher-student relationships.

Question 46 of the teacher survey, 'We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?' with possible response selections, 'a) the advantages of being a teacher

clearly outweigh the disadvantages,' 'b) if I could decide again, I would still choose to work as a teacher,' 'c) I would like to change to another school if that were possible,' 'd) I regret that I decided to become a teacher,' 'e) I enjoy working at this school,' 'f) I wonder whether it would have been better to choose another profession,' 'g) I would recommend my school as a good place to work,' 'h) I think that the teaching profession is valued in society,' 'i) I am satisfied with my performance in this school,' and 'j) All in all, I am satisfied with my job,' was analyzed for a possible relationship between student achievement and school climate under the secondary category of job satisfaction. For each part of the question, teachers selected if they 'strongly disagree,' 'disagree,' 'agree,' or 'strongly agree.' The researcher analyzed the data based on the percentage of teachers who agreed or strongly agreed with each statement. A *t*-test for significance of the correlation coefficient demonstrated significance for three of the ten tested variables (see Table 12). The null hypothesis was rejected for teachers' 'all in all' satisfaction with their jobs (*p*-value: 0.0044), teachers' recommendation that their school is a good place to work (*p*-value: 0.0044), and teachers' enjoyment in working at their school (*p*-value: 0.0339). The researcher found a relationship between student achievement and teachers' 'all in all' satisfaction with their jobs, teachers' recommendation that their school is a good place to work, and teachers' enjoyment in working at their school under the secondary category of job satisfaction.

Table 12

Correlations Between School Climate Factors and Student Achievement (Teacher Survey)

Variables	*r*	*p*
Collaboration among staff, students, and the community		
This school provides staff with opportunities to actively participate in school decisions	-0.168	0.5340
This school provides parents or guardians with opportunities to actively participate in school decisions	-0.177	0.5120
This school provides students with opportunities to actively participate in school decisions	0.257	0.3366
This school has a culture of shared responsibility for school issues	-0.451	0.0795
There is a collaborative school culture that which is characterized by mutual support	-0.010	0.9707
Teacher-student relationships		
In this school, teachers and students usually get on well with each other	0.299	0.2606
Most teachers in this school believe that the students' well-being is important	-0.232	0.3873
Most teachers in this school are interested in what students have to say	0.599	0.0142
If a student from this school needs extra assistance, the school provides it	0.320	0.2269
Job Satisfaction		
The advantages of being a teacher clearly outweigh the disadvantages	0.162	0.5489
If I could decide again, I would still choose to work as a teacher	-0.338	0.2004
I would like to change to another school if that were possible	-0.003	0.9912
I regret that I decided to become a teacher	0.132	0.6260
I enjoy working at this school	-0.672	0.0044

Table 12

Correlations Between School Climate Factors and Student Achievement – Continued

I wonder whether it would have been better to choose another Profession	0.433	0.0939
I would recommend my school as a good place to work	-0.671	0.0044
I think that the teaching profession is valued in society	0.011	0.9677
I am satisfied with my performance in this school	-0.452	0.0788
All in all, I am satisfied with my job	-0.532	0.0339

Note: $p \leq 0.05$

School leadership. Question 19 of the principal survey, 'On average throughout the school year, what percentage of time in your role as a principal do you spend on the following tasks in this school?' with possible response selections, 'a) administrative and leadership tasks and meetings,' 'b) curriculum and teaching-related tasks and meetings,' 'c) student interactions,' 'd) parent or guardian interactions,' 'e) interactions with local and regional community, business, and industry,' and 'f) other,' was analyzed for a possible relationship between student achievement and school leadership under the tertiary category percentage of time spent in school tasks. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables (see Table 13). The null hypothesis was not rejected for any variables, and the researcher found no relationship between student achievement and any of the tested variables under the tertiary category of percentage of time spent in school tasks.

Question 20 of the principal survey, 'Please indicate if you engaged in the following in this school during the last 12 months,' with possible response selections, 'a) I used student performance and student evaluation results (including national/international assessments) to develop the school's educational goals and

programs' and 'b) I worked on a professional development plan for this school,' was analyzed for a possible relationship between student achievement and school leadership under the tertiary category engagement in tasks related to student evaluation results and the development of a professional development plan. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the tested variables (Table 13), and the null hypothesis was not rejected for any variables. The researcher found no relationship between student achievement and any of the tested variables under the tertiary category engagement in tasks related to student evaluation results and the development of a professional development plan.

Question 21 of the principal survey, 'Please indicate how frequently you engaged in the following in this school during the last 12 months,' with possible response selections, 'a) I collaborated with teachers to solve classroom problems,' 'b) I observed instruction in the classroom,' 'c) I took actions to support cooperation among teachers to develop new teaching practices,' 'd) I took actions to ensure that teachers take responsibility for improving their teaching skills,' 'e) I took actions to ensure that teachers feel responsible for learning outcomes,' 'f) I provided parents or guardians with information on the school and student performance,' 'g) I checked for mistakes and errors in school administrative procedures and reports,' 'h) I resolved problems with the lesson timetable in this school,' and 'i) I collaborated with principals from other schools,' was analyzed for a possible relationship between student achievement and school leadership under the tertiary category frequency of school tasks. For each part of the question, principals selected if they 'never or rarely,' 'sometimes,' 'often,' or 'very often' engaged in the school tasks. The researcher analyzed data based on the percentage of principals

who engaged in each task ‘often’ or ‘very often.’ A *t*-test for significance of the correlation coefficient demonstrated significance for seven of the nine tested variables (see Table 13), and the null hypothesis was rejected for the following activities: collaborating with teachers to solve classroom discipline problems (*p*-value: 0.0104), ‘often’ or ‘very often,’ taking action to support cooperation among teachers to develop new teaching practices (*p*-value: 0.0041), ‘often’ or ‘very often,’ taking action to ensure that teachers take responsibility for improving their teaching skills (*p*-value: 0.0327), ‘often’ or ‘very often,’ taking action to ensure that teachers feel responsible for their students’ learning outcomes (*p*-value: 0.0376), ‘often’ or ‘very often,’ providing parents or guardians with information on the school and student performance (*p*-value: 0.0128), ‘often’ or ‘very often,’ checking for mistakes and errors in school and administrative procedures and reports (*p*-value: 0.0101), ‘often’ or ‘very often,’ and resolving problems with the lesson timetable in the school (*p*-value: 0.0148), ‘often’ or ‘very often.’ The researcher found a relationship between student achievement and the aforementioned activities, in which the null hypothesis was rejected, in the tertiary category of frequency of school tasks.

The researcher analyzed Question 23 of the principal survey, ‘Do you have a school governing board’ for a possible relationship between student achievement and school leadership under the tertiary category presence and composition of school governing board. A *t*-test for significance of the correlation coefficient demonstrated no significance for the presence of a school governing board (see Table 13), and the null hypothesis was not rejected for the tested variable. The researcher found no relationship

between student achievement and the presence of a school governing board under the tertiary category presence and composition of school governing board.

Table 13

Correlations Between School Leadership and Student Achievement

Variables	*r*	*p*
Percentage of time spent in school tasks		
Administrative and leadership tasks and meetings	0.131	0.6287
Curriculum and teaching- related tasks and meetings	-0.180	0.5047
Student interactions	-0.128	0.6366
Parent or guardian interactions	-0.089	0.7431
Interactions with local and regional community, business and industry	0.006	0.9824
Other	0.173	0.5217
Engagement in tasks related to student evaluation results and the development of a professional development plan		
Used student performance and student evaluation results (including national/international assessments) to develop the school's educational goals and programs	-0.122	0.6526
Worked on a professional development plan for the school	0.066	0.8081
Frequency of school tasks		
Collaborate with teachers to solve classroom discipline problems	-0.620	0.0104
Observe instruction in the classroom	-0.378	0.1489
Take action to support co-operation among teachers to develop new teaching practices	-0.675	0.0041
Take action to ensure that teachers take responsibility for improving their teaching skills	-0.535	0.0327
Take action to ensure that teachers feel responsible for their students' learning outcomes	-0.523	0.0376
Provide parents or guardians with information on the school and student performance	-0.606	0.0128

Table 13

Correlations Between School Leadership and Student Achievement - Continued

Check for mistakes and errors in school administrative procedures and reports	-0.622	0.0101
Resolve problems with the lesson timetable in the school	-0.596	0.0148
Collaborate with principals from other schools	-0.177	0.5120
Presence and composition of school governing board		
Presence of school governing board	0.114	0.6858
Representative of a local, municipal/regional, state, or national/federal authority are represented on school's governing board	-0.148	0.5986
Members of the school management team are represented on school's governing board	-0.398	0.1418
School administrative personnel are represented on school's governing board	-0.459	0.0852
Teachers are represented on school's governing board	-0.331	0.2282
Parents or guardians are represented on school's governing board	-0.236	0.3971
Students are represented on school's governing board	-0.217	0.4372
Trade unions are represented on school's governing board	-0.378	0.1648
Representatives of business labor market institutions, a church, or other private institutions are represented on school's governing board	0.081	0.7741
Others are represented on school's governing board	0.093	0.7417

Note: $p \leq 0.05$

Question 24 of the principal survey, 'Are the following currently represented on the school's governing board?' with possible response selections, 'a) representatives of a <local, municipality/regional, state, or national/federal> authority,' 'b) members of the school management team,' 'c) school administrative personnel,' 'd) teachers,' 'e) parents

or guardians,' 'f) students,' 'g) trade unions,' 'h) representatives of business (labor market institutions, a church,) or other private institutions,' and 'i) others,' were analyzed for a possible relationship between student achievement and school leadership under the tertiary category presence and composition of school governing board. A *t*-test for significance of the correlation coefficient demonstrated no significance for any of the members represented on the school governing board (see Table 13), and the null hypothesis was not rejected for any of the tested variables. The researcher found no relationship between student achievement and the different types of members represented on the school governing board under the tertiary category presence and composition of school governing board.

Teachers' instructional beliefs and pedagogical practices. Question 32 from the teacher survey, 'We would like to ask about your personal beliefs on teaching and learning. Please indicate how strongly you agree or disagree with each of the following statements' with possible response selections, 'a) my role as a teacher is to facilitate students' own inquiry,' 'b) students learn best by finding solutions to problems on their own,' 'c) students should be allowed to think of solutions to practical problems themselves before the teacher shows them how they are solved,' and 'd) thinking and reasoning processes are more important than specific curriculum content,' was analyzed for a possible relationship between student achievement and teachers' instructional beliefs and pedagogical practices under the secondary category teachers' personal beliefs on teaching and learning. For each part of the question, teachers selected if they 'strongly disagree,' 'disagree,' 'agree,' or 'strongly agree.' The researcher analyzed the data based on the percentage of teachers who agreed or strongly agreed with each statement. A *t*-test

for significance of the correlation coefficient demonstrated no significance for any of the teaching beliefs (see Table 14), and the null hypothesis was not rejected for any of the tested variables. The researcher found no relationship between student achievement and the teaching beliefs under the secondary category teachers' personal beliefs on teaching and learning.

Question 34 from the teacher survey, 'In your teaching, to what extent can you do the following?' with possible response selections, 'a) get students to believe they can do well in school work,' 'b) help my students value learning,' 'c) craft good questions for my students,' 'd) control disruptive behavior in the classroom,' 'e) motivate students who show low interest in school work,' 'f) make my expectations about student behavior clear,' 'g) help students think critically,' 'h) get students to follow classroom rules,' 'i) calm a student who is disruptive or noisy,' 'j) use a variety of assessment strategies,' 'k) provide an alternative explanation for an example when students are confused,' and 'l) implement alternative instructional strategies in my classroom,' was analyzed for a possible relationship between student achievement and teachers' instructional beliefs and pedagogical practices under the tertiary category teachers' self-efficacy. For each part of the question, teachers selected if they were able to perform the tasks 'not at all,' 'to some extent,' 'quite a bit,' or 'a lot.' The researcher analyzed the data based on the percentage of teachers who said they could perform each task 'quite a bit,' or 'a lot.' A *t*-test for significance of the correlation coefficient demonstrated significance for 11 of the 12 statements regarding teachers' self-efficacy (see Table 14), and the null hypothesis was rejected for 11 of the 12 tested variables. The researcher found a relationship between student achievement and teachers' beliefs they could perform the following statements

under the tertiary category teachers' self-efficacy: get my students to believe they can do well in school work (*p*-value: 0.0486), help my students value learning (*p*-value: 0.0188), craft good questions for my students (*p*-value: 0.0351), control disruptive behavior in the classroom (*p*-value: 0.0198), motivate students who show low interest in school work (*p*-value: 0.0048), help students think critically (*p*-value: 0.0168), get students to follow classroom rules (*p*-value: 0.0359), calm a student is disruptive or noisy (*p*-value: 0.0093), use a variety of assessment strategies (*p*-value: 0.0166), provide alternative explanation for an example when students are confused (*p*-value: 0.0112), and implement alternative instructional strategies in my classroom (*p*-value: 0.0157).

Question 39 from the teacher survey, 'For this <target class>, what percentage of <class> time is typically spent on each of the following activities?' with possible response selections. 'a) administrative tasks (e.g. recording attendance, handing out school information/forms),' 'b) keeping order in the classroom (maintaining discipline),' and 'c) actual teaching and learning,' was analyzed for a possible relationship between student achievement and teachers' instructional beliefs and pedagogical practices under the tertiary category distribution of class time. A *t*-test for significance of the correlation coefficient demonstrated no significance for the percentage of class time spent in administrative tasks, keeping order in the classroom, or actual teaching and learning (see Table 14). The null hypothesis was not rejected for any of the tested variables, and the researcher found no relationship between student achievement and the percentage of class time spent in administrative tasks, keeping order in the classroom, or actual teaching and learning under the tertiary category distribution of class time.

Question 43 from the teacher survey, 'How often do you use the following methods of assessing student learning in the <target class>?' with possible response selections, 'a) I develop and administer my own assessment,' 'b) I administer a standardized test,' 'c) I have individual students answer questions in front of the class,' 'd) I provide written feedback on student work in addition to a <mark, i.e. numeric score or letter grade>,' 'e) I let students evaluate their own progress,' and 'f) I observe students when working on particular tasks and provide immediate feedback,' was analyzed for a possible relationship between student achievement and teachers' instructional beliefs and pedagogical practices under the tertiary category teachers' use of assessment practices. For each part of the question, teachers selected if they used the assessment practices 'never or almost never,' 'occasionally,' frequently,' or 'in all or nearly all lessons.' The researcher analyzed the data based on the percentage of teachers who reported using the assessment methods 'frequently' or 'in all or nearly all lessons.' A *t*-test for significance of the correlation coefficient demonstrated significance for three of the six assessment practices (see Table 14), and the null hypothesis was rejected for teacher's use of the following practices 'frequently' or 'in all or nearly all lessons': developing and administering own assessment (*p*-value: 0.0223), letting students evaluate their own progress (*p*-value: 0.0155), and observing students when working on particular tasks and providing feedback (*p*-value: 0.0256). The researcher found a relationship between student achievement and teacher's use of the following practices 'frequently' or 'in all or nearly all lessons': developing and administering own assessment, letting students evaluate their own progress, and observing students when working on particular tasks and providing feedback under the tertiary category teachers' use of assessment practices.

Table 14

Correlations Between Teachers' Instructional Practices and Pedagogical Beliefs and Student Achievement

Variables	*r*	*p*
Teachers' personal beliefs on teaching and learning		
My role as a teacher is to facilitate students' own inquiry	0.445	0.0841
Students learn best by finding solutions to problems on their own	0.293	0.2708
Students should be allowed to think of solutions to practical problems themselves before the teacher shows them how they are solved	0.104	0.7015
Thinking and reasoning processes are more important than specific curriculum content	0.352	0.1812
Teachers' self-efficacy		
Get students to believe they can do well in school work	-0.500	0.0486
Help my students value learning	-0.579	0.0188
Craft good questions for my students	-0.529	0.0351
Control disruptive behavior in the classroom	-0.575	0.0198
Motivate students who show low interest in school work	-0.667	0.0048
Make my expectations about student behavior clear	-0.473	0.0643
Help students think critically	-0.587	0.0168
Get students to follow classroom rules	-0.527	0.0359
Calm a student who is disruptive or noisy	-0.627	0.0093
Use a variety of assessment strategies	-0.588	0.0166
Provide an alternative explanation for an example when students are confused	-0.615	0.0112
Implement alternative instructional strategies in my classroom	-0.592	0.0157

Table 14

Correlations: Instructional Practices and Pedagogical Beliefs - Continued

Distribution of class time		
Administrative tasks	-0.417	0.1081
Keeping order in the classroom	-0.095	0.7264
Actual teaching and learning	0.243	0.3645
Teachers' Use of Assessment Practices		
Develop and administer own assessment	-0.566	0.0223
Administer a standardized test	-0.081	0.7655
Individual students answer questions in front of the class	-0.355	0.1773
Provide written feedback on student work in addition to a mark, i.e., numeric score or letter grade	-0.379	0.1477
Let students evaluate their own progress	-0.593	0.0155
Observe students when working on particular tasks and provide immediate feedback	-0.555	0.0256

Note: $p \leq 0.05$

International Differences: School Working Conditions and Learning Environments

The factors from school working conditions and learning environments (initial teacher education and professional development, teacher appraisal and feedback, school climate, school leadership, and teachers' pedagogical practices and instructional beliefs) that demonstrated a relationship with student achievement were selected for further analysis. Each factor that demonstrated a significant relationship was analyzed to determine if differences existed for each factor between the U.S. and the top five (Singapore, Japan, Korea, Finland, and Poland), middle five (Czech Republic, Italy, Latvia, Portugal, and Spain), and the lowest five performing countries (Romania, Bulgaria, Mexico, Brazil, and Malaysia) measured by PISA scores.

The hypothesis analyzed in this section was as follows:

H_2: There is no difference in the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS between the United States and the other selected countries: Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Initial teacher education and professional development. The researcher analyzed the average number of days spent in observation visits to other schools (part c), Question 21 from the teacher survey, 'During the last 12 months, did you participate in any of the following professional development activities, and if yes, for how many days did they last?' to explore professional development differences in the tertiary category participation in professional development activities in the last 12 months. The *z*-test for difference in means between the U.S. and the selected countries demonstrated significance between the U.S. and Finland (*p*-value: 0.0170), Mexico (*p*-value: 0.0170), and Brazil (*p*-value: 0.0170) (see Table 15), and the null hypothesis was rejected for the U.S. compared to each of these three countries. The researcher found a difference in mean scores between the U.S. and Finland, Mexico, and Brazil, respectively.

Table 15

Average number of days spent in observation visits to other schools (as reported by teachers)

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	1.690	0.0910	N
United States to Japan	1.674	0.0942	N
United States to Korea	1.340	0.1804	N
United States to Finland	2.387	0.0170	Y
United States to Poland	-0.759	0.4477	N
Middle Performing Countries			
United States to Czech Republic	0.979	0.3275	N
United States to Italy	1.369	0.1711	N
United States to Latvia	0.228	0.8195	N
United States to Portugal	0.770	0.4412	N
United States to Spain	-1.479	0.1392	N
Lowest Performing Countries			
United States to Romania	-0.173	0.8628	N
United States to Bulgaria	1.761	0.0783	N
United States to Mexico	-3.998	0.0001	Y
United States to Brazil	-3.172	0.0015	Y
United States to Malaysia	1.602	0.1092	N

Note: $p \leq 0.05$

Teacher appraisal and feedback. The proportion of principals who reported a formal teacher appraisal was implemented by the school principal twice or more per year, Question 27a from the principal survey, was analyzed for teacher appraisal and feedback differences in the secondary category of frequency of formal appraisal by stakeholders. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Korea (*p*-value: 0.0229), Finland (*p*-

value: 0.0000), Czech Republic (*p*-value: 0.0037), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0401), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Mexico (*p*-value: 0.0032), and Malaysia (*p*-value: 0.0000) (see Table 16), and the null hypothesis was rejected for the U.S. compared to these countries. The researcher found a difference in proportions between the U.S. and Korea, Finland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Mexico, and Malaysia.

Table 16

Principals who report a formal teacher appraisal is implemented by the school principal twice or more per year

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-1.140	0.2542	N
United States to Japan	-1.704	0.0884	N
United States to Korea	2.275	0.0229	Y
United States to Finland	7.142	0.0000	Y
United States to Poland	1.326	0.1847	N
Middle Performing Countries			
United States to Czech Republic	-2.899	0.0037	Y
United States to Italy	6.338	0.0000	Y
United States to Latvia	2.053	0.0401	Y
United States to Portugal	7.671	0.0000	Y
United States to Spain	7.110	0.0000	Y
Lowest Performing Countries			
United States to Romania	-5.087	0.0000	Y
United States to Bulgaria	-0.166	0.8682	N
United States to Mexico	-2.951	0.0032	Y
United States to Brazil	-0.462	0.6438	N
United States to Malaysia	-6.199	0.0000	Y

Note: $p \leq 0.05$

The proportion of principals who reported that a formal teacher appraisal was implemented by other teachers twice or more per year, Question 27d from the principal survey, was analyzed for teacher appraisal and feedback differences in the secondary category of frequency of formal appraisal by stakeholders.

Table 17

Principals who report a formal teacher appraisal is implemented by other teachers twice or more per year

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-1.491	0.1359	N
United States to Japan	-4.832	0.0000	Y
United States to Korea	-4.246	0.0000	Y
United States to Finland	1.967	0.0492	Y
United States to Poland	1.116	0.2646	N
Middle Performing Countries			
United States to Czech Republic	-2.009	0.0446	Y
United States to Italy	2.014	0.0440	Y
United States to Latvia	-1.446	0.1482	N
United States to Portugal	-0.303	0.7622	N
United States to Spain	1.396	0.1626	N
Lowest Performing Countries			
United States to Romania	-4.396	0.0000	Y
United States to Bulgaria	-2.210	0.0271	Y
United States to Mexico	-4.467	0.0000	Y
United States to Brazil	-3.966	0.0001	Y
United States to Malaysia	-7.611	0.0000	Y

Note: $p \leq 0.05$

The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Japan (*p*-value: 0.0000), Korea

(*p*-value: 0.0000), Finland (*p*-value: 0.0492), Czech Republic (*p*-value: 0.0446), Italy (*p*-value: 0.0440), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0271), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0001), and Malaysia (*p*-value: 0.0000) (see Table 17), and the null hypothesis was rejected for the U.S. compared to these countries. The researcher found a difference in proportions between the U.S. and Japan, Korea, Finland, Czech Republic, Italy, Romania, Bulgaria, Mexico, Brazil, and Malaysia, respectively.

The proportion of principals who reported that a formal teacher appraisal was implemented by external individuals or bodies (e.g. inspectors, municipality representatives, districts/jurisdictions office personnel, or other persons from outside the school) twice or more per year, Question 27e from the principal survey, was analyzed for teacher appraisal and feedback differences in the secondary category of frequency of formal appraisal by stakeholders. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and seven of the 15 tested countries (see Table 18), and the null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Latvia (*p*-value: 0.0460), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0009), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Japan, Latvia, Romania, Bulgaria, Mexico, Brazil, and Malaysia, respectively.

Table 18

Principals who report a formal teacher appraisal is implemented by external bodies or individuals twice or more per year

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-0.822	0.4110	N
United States to Japan	-5.468	0.0000	Y
United States to Korea	-0.792	0.4286	N
United States to Finland	1.029	0.3036	N
United States to Poland	-1.815	0.0696	N
Middle Performing Countries			
United States to Czech Republic	-1.508	0.1316	N
United States to Italy	1.027	0.3044	N
United States to Latvia	-1.995	0.0460	Y
United States to Portugal	0.798	0.4247	N
United States to Spain	-0.413	0.6793	N
Lowest Performing Countries			
United States to Romania	-5.878	0.0000	Y
United States to Bulgaria	-5.670	0.0000	Y
United States to Mexico	-7.825	0.0000	Y
United States to Brazil	-3.308	0.0009	Y
United States to Malaysia	-8.966	0.0000	Y

Note: $p \leq 0.05$

The proportion of principals who reported that measures to remedy any weaknesses in teaching were discussed with the teacher most of the time after a formal teacher appraisal, Question 29a from the principal survey, was analyzed for teacher appraisal and feedback differences in the secondary category of frequency of outcomes resulting from formal appraisal. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Japan (*p*-

value: 0.0000), Korea (*p*-value: 0.0116), Finland (*p*-value: 0.0274), Czech Republic (*p*-value: 0.0415), Spain (*p*-value: 0.0159), and Malaysia (*p*-value: 0.0000) (see Table 19), and the null hypothesis was rejected for the U.S. compared to these countries. The researcher found a difference in proportions between the U.S. and Japan, Korea, Finland, Czech Republic, Spain, and Malaysia, respectively.

Table 19

Principals who report that measures to remedy any weaknesses in teaching are discussed with the teacher most of the time after a formal teacher appraisal

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-1.421	0.1553	N
United States to Japan	4.320	0.0000	Y
United States to Korea	2.524	0.0116	Y
United States to Finland	2.206	0.0274	Y
United States to Poland	1.157	0.2473	N
Middle Performing Countries			
United States to Czech Republic	2.039	0.0415	Y
United States to Italy	-1.238	0.2158	N
United States to Latvia	-1.167	0.2432	N
United States to Portugal	0.999	0.3180	N
United States to Spain	2.412	0.0159	Y
Lowest Performing Countries			
United States to Romania	0.591	0.5544	N
United States to Bulgaria	-0.825	0.4094	N
United States to Mexico	0.442	0.6583	N
United States to Brazil	0.961	0.3366	N
United States to Malaysia	-4.111	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported receiving feedback from other teachers, Question 28 from the teacher survey, was analyzed for teacher appraisal and feedback differences in the tertiary category of method by which stakeholders offer feedback. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and every country except Brazil (see Table 20).

Table 20

Teachers who report receiving feedback from other teachers

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-10.798	0.0000	Y
United States to Japan	-14.152	0.0000	Y
United States to Korea	-39.936	0.0000	Y
United States to Finland	-10.821	0.0000	Y
United States to Poland	-16.798	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	-17.525	0.0000	Y
United States to Italy	-8.579	0.0000	Y
United States to Latvia	-19.252	0.0000	Y
United States to Portugal	-19.865	0.0000	Y
United States to Spain	-5.392	0.0000	Y
Lowest Performing Countries			
United States to Romania	-14.086	0.0000	Y
United States to Bulgaria	-11.318	0.0000	Y
United States to Mexico	-5.407	0.0000	Y
United States to Brazil	-1.364	0.1725	N
United States to Malaysia	-4.291	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to all countries other than Brazil; Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal, Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, and Malaysia, respectively.

The proportion of teachers who reported the feedback they received emphasized student performance with ‘moderate’ or ‘high’ importance, Question 29a from the teacher survey, was analyzed for teacher appraisal and feedback differences in the tertiary category of areas of emphasis on feedback. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0001), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000), (see Table 21), and the null hypothesis was rejected for the U.S. compared to Singapore, Japan, Korea, Finland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Brazil, and Malaysia, respectively. The researcher found a difference in proportions between these countries.

Table 21

Teachers who report the feedback they received emphasized student performance with 'moderate' or 'high' importance

Comparison Pairing	***z***	***p***	**Significance**
Top Performing Countries			
United States to Singapore	-4.335	0.0000	Y
United States to Japan	12.995	0.0000	Y
United States to Korea	9.209	0.0000	Y
United States to Finland	14.483	0.0000	Y
United States to Poland	1.004	0.3156	N
Middle Performing Countries			
United States to Czech Republic	-3.893	0.0001	Y
United States to Italy	-5.067	0.0000	Y
United States to Latvia	-6.472	0.0000	Y
United States to Portugal	-4.661	0.0000	Y
United States to Spain	4.176	0.0000	Y
Lowest Performing Countries			
United States to Romania	-9.975	0.0000	Y
United States to Bulgaria	-0.373	0.7092	N
United States to Mexico	0.970	0.3320	N
United States to Brazil	-8.160	0.0000	Y
United States to Malaysia	-15.161	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported the feedback they received emphasized teaching in a multicultural or multilingual setting with 'moderate' or 'high' importance, Question 29g from the teacher survey, was analyzed for teacher appraisal and feedback differences in the tertiary category of areas of emphasis on feedback. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 out of the 15 tested countries (see Table 22).

Table 22

Teachers who report the feedback they received emphasized teaching in a multicultural or multilingual setting with 'moderate' or 'high' importance

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-0.990	0.3224	N
United States to Japan	7.407	0.0000	Y
United States to Korea	-14.872	0.0000	Y
United States to Finland	9.220	0.0000	Y
United States to Poland	16.677	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	-6.710	0.0000	Y
United States to Italy	-21.338	0.0000	Y
United States to Latvia	-4.128	0.0000	Y
United States to Portugal	-16.568	0.0000	Y
United States to Spain	-7.933	0.0000	Y
Lowest Performing Countries			
United States to Romania	-14.641	0.0000	Y
United States to Bulgaria	-10.002	0.0000	Y
United States to Mexico	-0.568	0.5704	N
United States to Brazil	-22.440	0.0000	Y
United States to Malaysia	-22.158	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in

proportions between the U.S. and Japan, Korea, Finland, Poland, Czech Republic, Latvia, Portugal, Spain, Romania, Bulgaria, Brazil, and Malaysia, respectively.

Table 23

Teachers who report the feedback they received emphasized the feedback they provided to other teachers to improve their teaching with 'moderate' or 'high' importance

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-18.152	0.0000	Y
United States to Japan	-17.414	0.0000	Y
United States to Korea	-29.320	0.0000	Y
United States to Finland	-1.789	0.0736	N
United States to Poland	-15.175	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	-23.083	0.0000	Y
United States to Italy	-26.679	0.0000	Y
United States to Latvia	-25.018	0.0000	Y
United States to Portugal	-32.606	0.0000	Y
United States to Spain	-16.253	0.0000	Y
Lowest Performing Countries			
United States to Romania	-32.129	0.0000	Y
United States to Bulgaria	-20.995	0.0000	Y
United States to Mexico	-14.990	0.0000	Y
United States to Brazil	-44.361	0.0000	Y
United States to Malaysia	-45.410	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported the feedback they received emphasized the feedback they provided to other teachers to improve their teaching with 'moderate' or 'high' importance, Question 29h from the teacher survey, was analyzed for teacher appraisal and feedback differences in the tertiary category of areas of emphasis

on feedback. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and every country except for Finland (see Table 23), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Poland, Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia, respectively.

School climate. The proportion of principals who agreed or strongly agreed that the school staff shared a common set of beliefs about schooling/learning, Question 30a from the principal survey, was analyzed for school climate differences in the secondary category of collaboration among staff, students, and the community. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Finland (*p*-value: 0.0101), Poland (*p*-value: 0.0302), Czech Republic (*p*-value: 0.0283), Italy (*p*-value: 0.0154), Portugal (*p*-value: 0.0098), Spain (*p*-value: 0.0016), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0135), and Malaysia (*p*-value: 0.0001) (see Table 24).

The proportion of teachers who agreed or strongly agreed that teachers in their school were interested in what students had to say, Question 45c from the teacher survey, was analyzed for school climate differences in the secondary category of student-teacher relationships.

Table 24

Principals who 'agree' or 'strongly agree' that the school staff share a common set of beliefs about schooling/learning

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	0.106	0.9155	N
United States to Japan	-0.298	0.7654	N
United States to Korea	0.674	0.5004	N
United States to Finland	2.573	0.0101	Y
United States to Poland	2.168	0.0302	Y
Middle Performing Countries			
United States to Czech Republic	2.193	0.0283	Y
United States to Italy	2.422	0.0154	Y
United States to Latvia	0.621	0.5348	N
United States to Portugal	2.582	0.0098	Y
United States to Spain	3.153	0.0016	Y
Lowest Performing Countries			
United States to Romania	1.612	0.1070	N
United States to Bulgaria	4.328	0.0000	Y
United States to Mexico	6.576	0.0000	Y
United States to Brazil	2.469	0.0135	Y
United States to Malaysia	3.896	0.0001	Y

Note: $p \leq 0.05$

The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore, Korea, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Mexico, Brazil, and Malaysia (Table 25). The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0005), Korea (*p*-value: 0.0031), Poland (*p*-value: 0.0006), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0161), Spain (*p*-value: 0.0000),

Romania (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Korea, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Mexico, Brazil, and Malaysia.

Table 25

Teachers who 'agree' or 'strongly agree' that most teachers in their school are interested in what students have to say

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	3.472	0.0005	Y
United States to Japan	0.302	0.7624	N
United States to Korea	2.954	0.0031	Y
United States to Finland	-0.906	0.3650	N
United States to Poland	3.444	0.0006	Y
Middle Performing Countries			
United States to Czech Republic	6.150	0.0000	Y
United States to Italy	6.068	0.0000	Y
United States to Latvia	-0.139	0.8897	N
United States to Portugal	2.406	0.0161	Y
United States to Spain	5.758	0.0000	Y
Lowest Performing Countries			
United States to Romania	6.156	0.0000	Y
United States to Bulgaria	0.438	0.6610	N
United States to Mexico	13.161	0.0000	Y
United States to Brazil	10.385	0.0000	Y
United States to Malaysia	5.985	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who agreed or strongly agreed that they enjoyed working at their school, Question 46e from the teacher survey, was analyzed for school

climate differences in the secondary category of job satisfaction. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and nine of the tested countries (see Table 26).

Table 26

Teachers who 'agree' or 'strongly agree' that they enjoy working at their school

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	5.612	0.0000	Y
United States to Japan	12.218	0.0000	Y
United States to Korea	14.615	0.0000	Y
United States to Finland	0.471	0.6373	N
United States to Poland	1.106	0.2689	N
Middle Performing Countries			
United States to Czech Republic	2.743	0.0061	Y
United States to Italy	0.726	0.4681	N
United States to Latvia	-1.393	0.1636	N
United States to Portugal	-2.121	0.0339	Y
United States to Spain	2.104	0.0354	Y
Lowest Performing Countries			
United States to Romania	-0.124	0.9017	N
United States to Bulgaria	0.711	0.4771	N
United States to Mexico	-4.378	0.0000	Y
United States to Brazil	-4.139	0.0000	Y
United States to Malaysia	-4.022	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0061), Portugal (*p*-value: 0.0339), Spain (*p*-value: 0.0354), Mexico *p*-value: 0.0000),

Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Czech Republic, Portugal, Spain, Mexico, Brazil, and Malaysia.

The proportion of teachers who agreed or strongly agreed that they would recommend their school as a good place to work, Question 46g from the teacher survey, was analyzed for school climate differences in the secondary category of job satisfaction.

Table 27

Teachers who 'agree' or 'strongly agree' that they would recommend their school as a good place to work

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	10.221	0.0000	Y
United States to Japan	17.991	0.0000	Y
United States to Korea	15.370	0.0000	Y
United States to Finland	-1.986	0.0470	Y
United States to Poland	0.999	0.3179	N
Middle Performing Countries			
United States to Czech Republic	0.969	0.3326	N
United States to Italy	-1.850	0.0643	N
United States to Latvia	-0.639	0.5229	N
United States to Portugal	-2.756	0.0058	Y
United States to Spain	-1.114	0.2655	N
Lowest Performing Countries			
United States to Romania	-1.949	0.0514	Y
United States to Bulgaria	-4.082	0.0000	Y
United States to Mexico	-3.900	0.0001	Y
United States to Brazil	-3.140	0.0017	Y
United States to Malaysia	-3.970	0.0001	Y

Note: $p \leq 0.05$

The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore, Japan, Korea, Finland, Portugal, Romania, Bulgaria, Mexico, Brazil, and Malaysia (see Table 27). The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0470), Portugal (*p*-value: 0.0058), Romania (*p*-value: 0.0514), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0001), Brazil (*p*-value: 0.0017), and Malaysia (*p*-value: 0.0001). The researcher found a difference in proportions between the U.S. and these countries.

The proportion of teachers who agreed or strongly agreed that all in all, they were satisfied with their job, Question 46j from the teacher survey, was analyzed for school climate differences in the secondary category of job satisfaction. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the 15 selected countries (see Table 28), and the null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0098), Finland (*p*-value: 0.0310), Poland (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0432), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0181), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0096), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Japan, Korea, Finland, Poland, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Table 28

Teachers who 'agree' or 'strongly agree' that all in all, they are satisfied with their job

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	0.762	0.4460	N
United States to Japan	4.122	0.0000	Y
United States to Korea	2.582	0.0098	Y
United States to Finland	-2.157	0.0310	Y
United States to Poland	-4.628	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	0.549	0.5828	N
United States to Italy	-7.019	0.0000	Y
United States to Latvia	-2.022	0.0432	Y
United States to Portugal	-6.675	0.0000	Y
United States to Spain	-8.162	0.0000	Y
Lowest Performing Countries			
United States to Romania	-2.363	0.0181	Y
United States to Bulgaria	-7.106	0.0000	Y
United States to Mexico	-13.183	0.0000	Y
United States to Brazil	2.591	0.0096	Y
United States to Malaysia	-11.312	0.0000	Y

Note: $p \leq 0.05$

School leadership. The proportion of principals who reported collaborating with classroom teachers to solve problems 'often' or 'very often,' Question 21a from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and four of the 15 countries. (Table 29), and the null hypothesis was rejected for the U.S. compared to

Singapore (*p*-value: 0.0047), Japan (*p*-value: 0.0000), Romania (*p*-value: 0.0003), and Malaysia (*p*-value: 0.0084). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Romania, and Malaysia.

Table 29

Principals who report collaborating with teachers to solve classroom problems 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	2.825	0.0047	Y
United States to Japan	7.965	0.0000	Y
United States to Korea	0.208	0.8356	N
United States to Finland	1.699	0.0893	N
United States to Poland	1.699	0.0894	N
Middle Performing Countries			
United States to Czech Republic	1.881	0.0599	N
United States to Italy	-0.967	0.3334	N
United States to Latvia	1.900	0.0574	N
United States to Portugal	1.811	0.0702	N
United States to Spain	-0.801	0.4231	N
Lowest Performing Countries			
United States to Romania	-3.661	0.0003	Y
United States to Bulgaria	0.149	0.8816	N
United States to Mexico	0.874	0.3820	N
United States to Brazil	-0.905	0.3656	N
United States to Malaysia	-2.636	0.0084	Y

Note: $p \leq 0.05$

The proportion of principals who reported taking action to support cooperation among teachers to develop new teaching practices 'often' or 'very often,' Question 21c from the principal survey, was analyzed for school leadership differences in the tertiary

category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Japan, Finland, Poland, Latvia, Portugal, Spain, and Malaysia (see Table 30), and the null hypothesis was rejected for the U.S. compared to these nations. The researcher found a difference in proportions between the U.S. and Japan, Finland, Poland, Latvia, Portugal, Spain, and Malaysia.

Table 30

Principals who report taking action to support co-operation among teachers to develop new teaching practices 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	1.733	0.0831	N
United States to Japan	7.100	0.0000	Y
United States to Korea	0.272	0.7858	N
United States to Finland	3.144	0.0017	Y
United States to Poland	2.256	0.0240	Y
Middle Performing Countries			
United States to Czech Republic	1.173	0.2407	N
United States to Italy	1.886	0.0593	N
United States to Latvia	1.940	0.0524	Y
United States to Portugal	2.545	0.0109	Y
United States to Spain	2.833	0.0046	Y
Lowest Performing Countries			
United States to Romania	-1.005	0.3150	N
United States to Bulgaria	1.077	0.2816	N
United States to Mexico	0.544	0.5865	N
United States to Brazil	-0.073	0.9420	N
United States to Malaysia	-5.700	0.0000	Y

Note: $p \leq 0.05$

The proportion of principals who reported taking action to ensure that teachers take responsibility for improving their teaching skills ‘often’ or ‘very often,’ Question 21d from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Japan, Finland, Spain, Romania, Bulgaria, and Malaysia (see Table 31).

Table 31

Principals who report taking action to ensure that teachers take responsibility for improving their teaching skills ‘often’ or ‘very often’

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-1.331	0.1831	N
United States to Japan	6.812	0.0000	Y
United States to Korea	0.082	0.9346	N
United States to Finland	6.297	0.0000	Y
United States to Poland	1.230	0.2188	N
Middle Performing Countries			
United States to Czech Republic	0.212	0.8325	N
United States to Italy	1.837	0.0662	N
United States to Latvia	-0.811	0.4176	N
United States to Portugal	1.231	0.2183	N
United States to Spain	2.536	0.0112	Y
Middle Performing Countries			
United States to Romania	-3.291	0.0010	Y
United States to Bulgaria	-4.055	0.0001	Y
United States to Mexico	-0.969	0.3325	N
United States to Brazil	-1.253	0.2103	N
United States to Malaysia	-5.698	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Spain (*p*-value: 0.0112), Romania (*p*-value: 0.0010), Bulgaria (*p*-value: 0.0001), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Japan, Finland, Spain, Romania, Bulgaria, and Malaysia.

The proportion of principals who reported taking action to ensure that teachers feel responsible for their students' learning outcomes 'often' or 'very often,' Question 21e from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and eight of the 15 selected countries (see Table 32), and the null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0022), Italy (*p*-value: 0.0010), Portugal (*p*-value: 0.0080), Spain (*p*-value: 0.0003), Bulgaria (*p*-value: 0.0007), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Japan, Finland, Czech Republic, Italy, Portugal, Spain, Bulgaria, and Malaysia.

Table 32

Principals who report taking action to ensure that teachers feel responsible for their students' learning outcomes 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-1.103	0.2700	N
United States to Japan	9.423	0.0000	Y
United States to Korea	1.476	0.1400	N
United States to Finland	7.284	0.0000	Y
United States to Poland	-1.320	0.1868	N
Middle Performing Countries			
United States to Czech Republic	3.067	0.0022	Y
United States to Italy	3.298	0.0010	Y
United States to Latvia	0.741	0.4586	N
United States to Portugal	2.654	0.0080	Y
United States to Spain	3.589	0.0003	Y
Lowest Performing Countries			
United States to Romania	-0.886	0.3755	N
United States to Bulgaria	-3.394	0.0007	Y
United States to Mexico	0.226	0.8211	N
United States to Brazil	0.943	0.3458	N
United States to Malaysia	-4.331	0.0000	Y

Note: $p \leq 0.05$

The proportion of principals who reported providing parents or guardians with information on the school and student performance 'often' or 'very often,' Question 21f from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and

Japan, Finland, Czech Republic, Latvia, Portugal, Spain, Romania, Mexico, Brazil, and Malaysia (Table 33).

Table 33

Principals who report providing parents or guardians with information on the school and student performance 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	0.817	0.4142	N
United States to Japan	3.766	0.0002	Y
United States to Korea	-0.785	0.4325	N
United States to Finland	7.846	0.0000	Y
United States to Poland	-1.684	0.0923	N
Middle Performing Countries			
United States to Czech Republic	3.235	0.0012	Y
United States to Italy	0.058	0.9537	N
United States to Latvia	2.935	0.0033	Y
United States to Portugal	-2.420	0.0155	Y
United States to Spain	-2.229	0.0258	Y
Lowest Performing Countries			
United States to Romania	-4.385	0.0000	Y
United States to Bulgaria	-1.204	0.2287	N
United States to Mexico	-5.002	0.0000	Y
United States to Brazil	-5.163	0.0000	Y
United States to Malaysia	-2.819	0.0048	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0002), Finland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0012), Latvia (*p*-value: 0.0033), Portugal (*p*-value: 0.0155), Spain(*p*-value: 0.0258), Romania (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The

researcher found a difference in proportions between the U.S. and Japan, Finland, Czech Republic, Latvia, Portugal, Spain, Romania, Mexico, Brazil, and Malaysia.

The proportion of principals who reported checking for mistakes and errors in school administrative procedures and reports ‘often’ or ‘very often,’ Question 21g from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore, Korea, Poland, Czech Republic, Italy, Latvia, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia (see Table 34). and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Poland (*p*-value: 0.0004), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Korea, Poland, Czech Republic, Italy, Latvia, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Table 34

Principals who report checking for mistakes and errors in school administrative procedures and reports 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-4.710	0.0000	Y
United States to Japan	0.711	0.4770	N
United States to Korea	-5.746	0.0000	Y
United States to Finland	-0.806	0.4201	N
United States to Poland	-3.524	0.0004	Y
Middle Performing Countries			
United States to Czech Republic	-10.948	0.0000	Y
United States to Italy	-5.526	0.0000	Y
United States to Latvia	-5.348	0.0000	Y
United States to Portugal	0.670	0.5027	N
United States to Spain	-4.295	0.0000	Y
Lowest Performing Countries			
United States to Romania	-10.433	0.0000	Y
United States to Bulgaria	-7.727	0.0000	Y
United States to Mexico	-9.187	0.0000	Y
United States to Brazil	-9.804	0.0000	Y
United States to Malaysia	-8.978	0.0000	Y

Note: $p \leq 0.05$

The proportion of principals who reported resolving problems with the lesson timetable 'often' or 'very often,' Question 21h from the principal survey, was analyzed for school leadership differences in the tertiary category of frequency of school tasks. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the 15 tested countries (see Table 35).

Table 35

Principals who report resolving problems with the lesson timetable in the school 'often' or 'very often'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-0.196	0.8448	N
United States to Japan	5.148	0.0000	Y
United States to Korea	-2.798	0.0051	Y
United States to Finland	-7.217	0.0000	Y
United States to Poland	-1.788	0.0738	N
Middle Performing Countries			
United States to Czech Republic	2.314	0.0207	Y
United States to Italy	-3.185	0.0014	Y
United States to Latvia	2.177	0.0295	Y
United States to Portugal	-6.063	0.0000	Y
United States to Spain	-3.651	0.0003	Y
Lowest Performing Countries			
United States to Romania	-9.424	0.0000	Y
United States to Bulgaria	-4.263	0.0000	Y
United States to Mexico	-6.414	0.0000	Y
United States to Brazil	-6.866	0.0000	Y
United States to Malaysia	-7.249	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0051), Finland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0207), Italy (*p*-value: 0.0014), Latvia (*p*-value: 0.0295), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0003), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Japan, Korea, Finland,

Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Teachers' instructional beliefs and pedagogical practices. The proportion of teachers who reported feeling they could get students to believe they can do well in school work 'quite a bit' or 'a lot,' Question 34a from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the 15 tested countries (see Table 36), and the null hypothesis was rejected for the U.S. compared to Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Poland (*p*-value: 0.0054), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000); therefore, the researcher found a difference in proportions between the U.S. and these 13 countries.

Table 36

Teachers who report they feel they can get students to believe they can do well in school work 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-0.187	0.8515	N
United States to Japan	47.309	0.0000	Y
United States to Korea	4.315	0.0000	Y
United States to Finland	-0.183	0.8546	N
United States to Poland	2.781	0.0054	Y
Middle Performing Countries			
United States to Czech Republic	23.859	0.0000	Y
United States to Italy	-19.250	0.0000	Y
United States to Latvia	-7.022	0.0000	Y
United States to Portugal	-22.073	0.0000	Y
United States to Spain	10.265	0.0000	Y
Lowest Performing Countries			
United States to Romania	-18.970	0.0000	Y
United States to Bulgaria	-8.582	0.0000	Y
United States to Mexico	-4.113	0.0000	Y
United States to Brazil	-24.179	0.0000	Y
United States to Malaysia	-14.649	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could help their students value learning 'quite a bit' or 'a lot,' Question 34b from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and all but two of the tested countries (see Table 37).

Table 37

Teachers who report they feel they can help their students value learning 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-5.503	0.0000	Y
United States to Japan	34.816	0.0000	Y
United States to Korea	-2.672	0.0075	Y
United States to Finland	-1.827	0.0678	N
United States to Poland	5.717	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	25.023	0.0000	Y
United States to Italy	-22.320	0.0000	Y
United States to Latvia	-2.714	0.0066	Y
United States to Portugal	-29.227	0.0000	Y
United States to Spain	0.721	0.4709	N
Lowest Performing Countries			
United States to Romania	-21.421	0.0000	Y
United States to Bulgaria	-20.281	0.0000	Y
United States to Mexico	-15.436	0.0000	Y
United States to Brazil	-30.878	0.0000	Y
United States to Malaysia	-25.126	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0075), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0066), Portugal (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan,

Korea, Poland, Czech Republic, Italy, Latvia, Portugal, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

The proportion of teachers who reported feeling they could craft good questions for their students 'quite a bit' or 'a lot,' Question 34c from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and every country except for Spain (see Table 38), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0221), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0049), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Table 38

Teachers who report they feel they can craft good questions for their students 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	6.365	0.0000	Y
United States to Japan	32.351	0.0000	Y
United States to Korea	9.332	0.0000	Y
United States to Finland	-2.288	0.0221	Y
United States to Poland	8.075	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	14.170	0.0000	Y
United States to Italy	-7.342	0.0000	Y
United States to Latvia	-6.071	0.0000	Y
United States to Portugal	-16.082	0.0000	Y
United States to Spain	1.764	0.0778	N
Lowest Performing Countries			
United States to Romania	-17.186	0.0000	Y
United States to Bulgaria	5.392	0.0000	Y
United States to Mexico	2.812	0.0049	Y
United States to Brazil	-20.958	0.0000	Y
United States to Malaysia	-10.287	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could control disruptive behavior in the classroom 'quite a bit' or 'a lot,' Question 34d from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance

between the U.S. and Singapore, Japan, Korea, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Brazil, and Malaysia (see Table 39).

Table 39

Teachers who report they feel they can control disruptive behavior in the classroom 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	6.024	0.0000	Y
United States to Japan	24.675	0.0000	Y
United States to Korea	8.469	0.0000	Y
United States to Finland	-0.098	0.9220	N
United States to Poland	-2.284	0.0224	Y
Middle Performing Countries			
United States to Czech Republic	7.975	0.0000	Y
United States to Italy	-8.969	0.0000	Y
United States to Latvia	0.907	0.3643	N
United States to Portugal	-13.440	0.0000	Y
United States to Spain	4.392	0.0000	Y
Lowest Performing Countries			
United States to Romania	-16.377	0.0000	Y
United States to Bulgaria	-0.199	0.8423	N
United States to Mexico	0.200	0.8419	N
United States to Brazil	-4.661	0.0000	Y
United States to Malaysia	-12.973	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. and Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Poland (*p*-value: 0.0224), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-

value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Brazil, and Malaysia.

The proportion of teachers who reported feeling they could motivate students who showed low interest in school work ‘quite a bit’ or ‘a lot,’ Question 34e from the teacher survey, was analyzed for differences in teachers’ instructional beliefs and pedagogical practices under the tertiary category of teachers’ self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore, Japan, Czech Republic, Italy, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia (Table 40), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Czech Republic, Italy, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Table 40

Teachers who report they feel they can motivate students who show low interest in school work 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	-7.554	0.0000	Y
United States to Japan	29.327	0.0000	Y
United States to Korea	1.327	0.1846	N
United States to Finland	1.039	0.2990	N
United States to Poland	1.540	0.1236	N
Middle Performing Countries			
United States to Czech Republic	22.442	0.0000	Y
United States to Italy	-21.434	0.0000	Y
United States to Latvia	-1.914	0.0556	N
United States to Portugal	-29.958	0.0000	Y
United States to Spain	5.922	0.0000	Y
Lowest Performing Countries			
United States to Romania	-22.855	0.0000	Y
United States to Bulgaria	-4.243	0.0000	Y
United States to Mexico	-13.316	0.0000	Y
United States to Brazil	-29.267	0.0000	Y
United States to Malaysia	-29.764	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could help students think critically 'quite a bit' or 'a lot,' Question 34g from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the tested countries (see Table 41), and the null hypothesis was rejected for the U.S.

compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0003), Romania (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and these 13 countries.

Table 41

Teachers who report they feel they can help students think critically 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	6.743	0.0000	Y
United States to Japan	48.534	0.0000	Y
United States to Korea	14.622	0.0000	Y
United States to Finland	8.176	0.0000	Y
United States to Poland	4.866	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	22.490	0.0000	Y
United States to Italy	-14.214	0.0000	Y
United States to Latvia	0.000	1.0000	N
United States to Portugal	-19.450	0.0000	Y
United States to Spain	3.607	0.0003	Y
Lowest Performing Countries			
United States to Romania	-11.835	0.0000	Y
United States to Bulgaria	0.452	0.6516	N
United States to Mexico	-5.876	0.0000	Y
United States to Brazil	-20.509	0.0000	Y
United States to Malaysia	-9.512	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could get students to follow classroom rules ‘quite a bit’ or ‘a lot,’ Question 34h from the teacher survey, was analyzed for differences in teachers’ instructional beliefs and pedagogical practices under the tertiary category of teachers’ self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and all of the test countries (see Table 42).

Table 42

Teachers who report they feel they can get students to follow classroom rules ‘quite a bit’ or ‘a lot’

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	5.720	0.0000	Y
United States to Japan	29.582	0.0000	Y
United States to Korea	8.174	0.0000	Y
United States to Finland	2.777	0.0055	Y
United States to Poland	-2.456	0.0141	Y
Middle Performing Countries			
United States to Czech Republic	11.460	0.0000	Y
United States to Italy	-10.870	0.0000	Y
United States to Latvia	-2.953	0.0032	Y
United States to Portugal	-12.917	0.0000	Y
United States to Spain	5.503	0.0000	Y
Lowest Performing Countries			
United States to Romania	-12.945	0.0000	Y
United States to Bulgaria	-9.366	0.0000	Y
United States to Mexico	4.362	0.0000	Y
United States to Brazil	-3.532	0.0004	Y
United States to Malaysia	-13.139	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0055), Poland (*p*-value: 0.0141), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0032), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0004), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and all of the tested countries.

The proportion of teachers who reported feeling they could calm a student who was disruptive or noisy ‘quite a bit’ or ‘a lot,’ Question 34i from the teacher survey, was analyzed for differences in teachers’ instructional beliefs and pedagogical practices under the tertiary category of teachers’ self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and all of the tested countries with the exception of Latvia (see Table 43), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0002), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0001), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0021), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and these countries.

Table 43

Teachers who report they feel they can calm a students who is disruptive or noisy 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	5.220	0.0000	Y
United States to Japan	22.909	0.0000	Y
United States to Korea	6.833	0.0000	Y
United States to Finland	3.725	0.0002	Y
United States to Poland	-5.676	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	3.821	0.0001	Y
United States to Italy	-8.341	0.0000	Y
United States to Latvia	0.327	0.7439	N
United States to Portugal	-16.413	0.0000	Y
United States to Spain	6.521	0.0000	Y
Lowest Performing Countries			
United States to Romania	-20.383	0.0000	Y
United States to Bulgaria	-6.099	0.0000	Y
United States to Mexico	3.074	0.0021	Y
United States to Brazil	-11.387	0.0000	Y
United States to Malaysia	-17.985	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could use a variety of assessment strategies 'quite a bit' or 'a lot,' Question 34j from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the 15 tested countries (see Table 44).

Table 44

Teachers who report they feel they can use a variety of assessment strategies 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	8.779	0.0000	Y
United States to Japan	39.465	0.0000	Y
United States to Korea	12.276	0.0000	Y
United States to Finland	13.787	0.0000	Y
United States to Poland	-4.151	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	8.609	0.0000	Y
United States to Italy	-8.877	0.0000	Y
United States to Latvia	-6.976	0.0000	Y
United States to Portugal	-21.601	0.0000	Y
United States to Spain	-4.351	0.0000	Y
Lowest Performing Countries			
United States to Romania	-20.138	0.0000	Y
United States to Bulgaria	-5.084	0.0000	Y
United States to Mexico	-1.206	0.2277	N
United States to Brazil	-12.075	0.0000	Y
United States to Malaysia	-5.954	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan,

Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, and Malaysia.

The proportion of teachers who reported feeling they could provide an alternative explanation for examples when students were confused ‘quite a bit’ or ‘a lot,’ Question 34k from the teacher survey, was analyzed for differences in teachers’ instructional beliefs and pedagogical practices under the tertiary category of teachers’ self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Bulgaria, Brazil, and Malaysia (see Table 45), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Portugal, Spain, Romania, Bulgaria, Brazil, and Malaysia.

Table 45

Teachers who report they feel they can provide an alternative explanation for an example when students are confused 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	5.097	0.0000	Y
United States to Japan	29.207	0.0000	Y
United States to Korea	11.283	0.0000	Y
United States to Finland	14.536	0.0000	Y
United States to Poland	6.355	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	8.251	0.0000	Y
United States to Italy	-10.007	0.0000	Y
United States to Latvia	1.769	0.0770	N
United States to Portugal	-13.111	0.0000	Y
United States to Spain	-5.856	0.0000	Y
Lowest Performing Countries			
United States to Romania	-13.199	0.0000	Y
United States to Bulgaria	-4.573	0.0000	Y
United States to Mexico	-1.114	0.2651	N
United States to Brazil	-11.877	0.0000	Y
United States to Malaysia	-4.412	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported feeling they could implement alternative instructional strategies in their classrooms 'quite a bit' or 'a lot,' Question 34l from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' self-efficacy. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and all the tested countries but Spain (see Table 46).

Table 46

Teachers who report they feel they can implement alternative instructional strategies in their classrooms 'quite a bit' or 'a lot'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	7.894	0.0000	Y
United States to Japan	27.711	0.0000	Y
United States to Korea	14.943	0.0000	Y
United States to Finland	11.016	0.0000	Y
United States to Poland	13.100	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	21.856	0.0000	Y
United States to Italy	-9.491	0.0000	Y
United States to Latvia	14.414	0.0000	Y
United States to Portugal	-16.818	0.0000	Y
United States to Spain	-0.651	0.5151	N
Lowest Performing Countries			
United States to Romania	-12.042	0.0000	Y
United States to Bulgaria	10.145	0.0000	Y
United States to Mexico	-4.9220	0.0000	Y
United States to Brazil	-6.673	0.0000	Y
United States to Malaysia	-7.071	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the

U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

The proportion of teachers who reported they developed and administered their own assessments 'frequently' or 'in all or nearly all lessons,' Question 43a from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' use of assessment practices. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and all the tested countries (see Table 47), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Poland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Table 47

Teachers who report they develop and administer their own assessments 'frequently' or 'in all or nearly all lessons'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	15.677	0.0000	Y
United States to Japan	39.382	0.0000	Y
United States to Korea	36.868	0.0000	Y
United States to Finland	14.378	0.0000	Y
United States to Poland	19.590	0.0000	Y
Middle Performing Countries			
United States to Czech Republic	10.556	0.0000	Y
United States to Italy	12.885	0.0000	Y
United States to Latvia	23.019	0.0000	Y
United States to Portugal	2.380	0.0173	Y
United States to Spain	7.456	0.0000	Y
Lowest Performing Countries			
United States to Romania	8.051	0.0000	Y
United States to Bulgaria	13.092	0.0000	Y
United States to Mexico	5.556	0.0000	Y
United States to Brazil	-13.077	0.0000	Y
United States to Malaysia	15.058	0.0000	Y

Note: $p \leq 0.05$

The proportion of teachers who reported they let students evaluate their own progress 'frequently' or 'in all or nearly all lessons,' Question 43e from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' use of assessment practices. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated

significance between the U.S. and Singapore, Japan, Korea, Finland, Italy, Latvia, Portugal, Spain, Bulgaria, Mexico, Brazil, and Malaysia (see Table 48).

Table 48

Teachers who report they let students evaluate their own progress 'frequently' or 'in all or nearly all lessons'

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	4.362	0.0000	Y
United States to Japan	8.310	0.0000	Y
United States to Korea	12.712	0.0000	Y
United States to Finland	7.775	0.0000	Y
United States to Poland	-0.442	0.6582	N
Middle Performing Countries			
United States to Czech Republic	1.007	0.3141	N
United States to Italy	6.968	0.0000	Y
United States to Latvia	-6.165	0.0000	Y
United States to Portugal	-15.120	0.0000	Y
United States to Spain	12.750	0.0000	Y
Lowest Performing Countries			
United States to Romania	-1.712	0.0870	N
United States to Bulgaria	9.943	0.0000	Y
United States to Mexico	-16.326	0.0000	Y
United States to Brazil	-4.333	0.0000	Y
United States to Malaysia	-19.395	0.0000	Y

Note: $p \leq 0.05$

The null hypothesis was rejected for Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0000), Portugal (*p*-value: 0.0000), Spain (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0000), Brazil (*p*-value: 0.0000), and Malaysia (*p*-

value: 0.0000). The researcher found a difference in proportions between the U.S. and Singapore, Japan, Korea, Finland, Italy, Latvia, Portugal, Spain, Bulgaria, Mexico, Brazil, and Malaysia.

The proportion of teachers who reported they observe students when working on particular tasks and provide immediate feedback 'frequently' or 'in all or nearly all lessons,' Question 43f from the teacher survey, was analyzed for differences in teachers' instructional beliefs and pedagogical practices under the tertiary category of teachers' use of assessment practices. The *z*-test for difference in proportions between the U.S. and the selected countries demonstrated significance between the U.S. and 13 of the 15 tested countries (see Table 49), and the null hypothesis was rejected for the U.S. compared to Singapore (*p*-value: 0.0000), Japan (*p*-value: 0.0000), Korea (*p*-value: 0.0000), Finland (*p*-value: 0.0000), Czech Republic (*p*-value: 0.0000), Italy (*p*-value: 0.0000), Latvia (*p*-value: 0.0003), Spain (*p*-value: 0.0000), Romania (*p*-value: 0.0000), Bulgaria (*p*-value: 0.0000), Mexico (*p*-value: 0.0115), Brazil (*p*-value: 0.0000), and Malaysia (*p*-value: 0.0000). The researcher found a difference in proportions between the U.S. and these countries.

Table 49

Teachers who report they observe students when working on particular tasks and provide immediate feedback 'frequently' or 'in all or nearly all lessons

Comparison Pairing	*z*	*p*	Significance
Top Performing Countries			
United States to Singapore	9.908	0.0000	Y
United States to Japan	32.682	0.0000	Y
United States to Korea	30.188	0.0000	Y
United States to Finland	10.798	0.0000	Y
United States to Poland	-0.341	0.7330	N
Middle Performing Countries			
United States to Czech Republic	5.978	0.0000	Y
United States to Italy	8.509	0.0000	Y
United States to Latvia	3.629	0.0003	Y
United States to Portugal	-1.027	0.3043	N
United States to Spain	6.096	0.0000	Y
Lowest Performing Countries			
United States to Romania	4.390	0.0000	Y
United States to Bulgaria	8.216	0.0000	Y
United States to Mexico	-2.527	0.0115	Y
United States to Brazil	8.227	0.0000	Y
United States to Malaysia	-6.318	0.0000	Y

Note: $p \leq 0.05$

Summary

The analysis of the data in this study revealed several relationships among factors of teaching and learning and student achievement and several differences in these factors between the U.S. and the selected countries. Based on the results, many of the factors demonstrated an inverse relationship with student achievement, which was contrary to

much of the research on teaching and learning factors. In the next chapter, the researcher interpreted the results and provided suggestions for future research.

Chapter Five: Discussion

The purpose of this study was to determine if relationships existed among factors of school working conditions and learning environments and student achievement on international assessments. Factors examined included: initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices. Additionally, the study sought to determine if there were differences in these factors between the U.S. and other countries. The researcher utilized data from the 2013 TALIS and the 2012 PISA in order to test the hypotheses. This chapter discusses the study results in light of then-current research, makes recommendations to educators and policymakers based on the findings, and provides recommendations for further research.

Hypotheses

Hypotheses tested for this study were as follows:

H_1: There is a relationship between the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices) measured on the TALIS and reading achievement measured by the PISA among the selected countries: United States, Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

H_2: There is a difference in the factors of school working conditions and learning environments (initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers'

instructional beliefs and pedagogical practices) measured on the TALIS between the United States and the other selected countries: Singapore, Japan, Korea, Finland, Poland, Czech Republic, Italy, Latvia, Portugal, Spain, Romania, Bulgaria, Mexico, Brazil, and Malaysia.

Initial Teacher Education and Professional Development

To determine the relationship between professional development and student achievement, the researcher selected three categories for analysis from the TALIS: participation in professional development activities, positive impact of professional development topics, and structure of professional development activities. The questions assessing these categories were answered by participants with respect to the 12 months previous to their response to the prompt provided in the TALIS. Of the tested characteristics from each category, the only characteristic that demonstrated significance at the $p \leq 0.05$ level was an inverse relationship represented by the average number of days teachers spent in observation visits to other schools ($r = -0.515$). These findings suggested the way in which school districts implemented professional development had little bearing on student achievement. This finding was consistent with Hattie's (2009, 2012) results that professional development, while likely to change teacher learning , had far less influence on student learning (Hattie, 2009, p. 120). Additionally, Hattie (2009) stated the most effective types of instruction in improving teacher knowledge and behavior were observation of actual classroom methods, microteaching, video/audio feedback, and practice. During the process of selecting the questions from the TALIS based on Marzano's (2003, 2006, 2007) and Hattie's (2009, 2012) research, the researcher observed that none of the questions regarding professional development on the

TALIS teacher survey specifically asked about microteaching, video/audio feedback, or practice. The researcher believed this was most likely, because these types of professional development activities were uncommon. However, based on the lack of significant relationships between student achievement and the tested characteristics of professional development, the researcher believed those types of professional development experiences possibly should be embedded in school practices.

Teacher Appraisal and Feedback

The categories selected to test the relationship between student achievement and teacher appraisal and feedback were frequency of formal appraisal by stakeholders, tasks performed by participating members in formal appraisal, outcomes resulting from formal appraisal, method by which stakeholders offer feedback, areas of emphasis on feedback, and feedback procedures. Frequency of formal appraisal by stakeholders demonstrated three significant ($p \leq 0.05$) inverse relationships out of the five characteristics tested: appraisal performed by school principal twice or more per year (r = -0.495), appraisal performed by other teachers twice or more per year (r = -0.520), and appraisal performed by external individuals or bodies twice or more per year (r = -0.690). Other characteristics which demonstrated significant relationships to student achievement included: measures to remedy any weaknesses in teaching were discussed with the teacher ‘most of the time’ (r = -0.507), teachers who reported receiving feedback from other teachers (r = 0.490), feedback that emphasized student performance with ‘moderate’ or ‘high’ importance (r = -0.594), feedback that emphasized teaching in a multicultural or multilingual setting with ‘moderate’ or ‘high’ importance (r = -0.557), and feedback that emphasized the feedback the teacher provided to other teachers to

improve their teaching (r = -0.500). No significance was found for the characteristics within the tasks performed by participating members in formal appraisal, the methods by which stakeholders offer feedback, and feedback procedures.

Out of the characteristics tested, the only characteristic that demonstrated a significant positive relationship with student achievement was the teachers who reported receiving feedback from other teachers. This positive relationship suggested that education systems be designed in ways that allow other teachers to observe each other's classrooms and offer feedback. A z-test of proportions comparing the U.S. to the other selected countries revealed the proportion of teachers in the U.S. who reported receiving feedback from other teachers was significantly less (z < -1.96) than every tested country except for Brazil. Based on this finding, the researcher recommended that school leaders in the U.S. should implement a greater opportunity for teachers to not only work collaboratively, but provide teachers with the necessary skills and time to offer each other meaningful feedback. Additionally, a Pearson Product Moment Correlation analysis revealed the appraisal performed by external individuals or bodies twice or more per year (r = -0.690) demonstrated the strongest relationship within the category of teacher appraisal and feedback to student achievement. This finding signified the harm in allowing external bodies to appraise teachers, which the researcher believed diminishes the autonomy provided to both school leaders and teachers.

Finally, as stated in the literature review, schools in the U.S. underwent changes to their evaluation systems. Waivers issued by the government required evaluations to include data on student growth that resulted in employment decisions (USDOE, 2012). While student data continued to play an increasingly important role in evaluations in the

U.S., findings from this study revealed that feedback that emphasized student performance with 'moderate' or 'high' importance demonstrated a significant inverse relationship to student achievement (r = -0.594). These findings supported the apprehension regarding external accountability measures expressed by several educational experts (Darling-Hammond, 2012; Fullan et al., 2015). Additionally, the difference in proportions test revealed that in the U.S., feedback that emphasized student performance was significantly greater ($z > 1.96$) than in three of the five top performing countries (Japan, Korea, and Finland), significantly less ($z < -1.96$) than one of the top performing countries (Singapore), and not significantly different from one of the top performing countries (Poland). This result suggested a majority of top performing countries utilized other measures of appraisal and feedback more frequently. Based on these findings, the researcher recommended that policymakers and educational leaders in the U.S. complete further research on the efficacy of using student growth models and explore other options in evaluation frameworks.

School Climate

The categories selected to determine the relationship between student achievement and school climate were collaboration among staff, students, and the community; teacher-student relationships; and job satisfaction. Within the category of collaboration among staff, students, and the community, the only characteristic that demonstrated a significant relationship ($p \leq 0.05$) with student achievement was that the school staff shared a common set of beliefs about schooling and learning (r = 0.632). Additionally, in teacher-student relationships, one characteristic demonstrated a significant relationship with student achievement: most teachers in this school are

interested in what students have to say ($r = 0.599$). Of the numerous Pearson Product Moment Correlation Coefficients computed for this analysis, only three significant positive relationships resulted between student achievement and the selected characteristics of school working conditions and learning environments. Two of these significant positive relationships resulted within the school climate factor, which highlights the importance of a healthy school climate. These findings were concurrent with the findings of several other educational researchers (Brand et al., 2003; Freiberg, 1999; Good & Weinstein, 1986; Ma & Klinger, 2000; MacNeil, Prater, & Busch, 2009).

A *z*-test for difference in proportions revealed the U.S. was not significantly different than the top three performers in the proportion of principals who thought the school staff shared a common set of beliefs about schooling/learning. While this finding indicated a strength of the U.S. educational system, as this characteristic was significantly positively related to student achievement, the researcher questioned the validity of the reported response from principals in the U.S. As teachers in the U.S. reported receiving less feedback from other teachers than indicated in responses from any other country except Brazil, the researcher believed these teachers were insufficiently aware of each other's beliefs and practices. While teachers in the U.S. assumed they shared a common set of beliefs, the researcher believed they were given inadequate time to observe each other and collaborate to know this was true.

Another *z*-test of proportions demonstrated that teachers in the U.S. reported they were interested in what students had to say significantly more ($z > 1.96$) than 11 of the other tested countries. Of the high performing countries, reports from the U.S. were significantly greater than from three of the top-performers (Singapore, Korea, and

Poland) and not significantly different from two of the top-performers (Japan and Finland). This finding suggested this was another strength of the educational system in the U.S. To capitalize on this strength and its significant positive relationship with student achievement, the U.S. should be wary of reforms that could threaten teacher-student relations, such as overemphasis on external testing.

The category of job satisfaction had three characteristics that demonstrated significant, inverse relationships with student achievement: teachers who agreed or strongly agreed that they enjoyed working at their school (r = -0.672), teachers who would recommend their school as a good place to work (r = -0.671), and teachers who reported they were all in all, satisfied with their job (r = -0.532). These findings indicated that simply trying to improve teachers' job satisfaction would not result in increased student performance. If a school wishes to focus on enhancing job satisfaction, it should focus on implementing strategies that were significantly related to student achievement, such as increasing teachers' ability to give each other feedback and collaborate on their beliefs about teaching and learning.

School Leadership

The following categories were selected to determine the relationship between student achievement and school leadership: percentage of time spent in school tasks, engagement in tasks related to student evaluation results and the development of a professional development plan, frequency of school tasks, and the presence and composition of school governing board. The only category that contained characteristics that established significant relationships ($p \leq 0.05$) to student achievement was the frequency of school tasks. In this category, seven out of the nine tested characteristics

demonstrated a significant inverse relationship with student achievement (based on items principals did ‘often’ or ‘very often’) (see Table 13). When these characteristics were tested for the differences among the selected countries using a *z*-test for difference in proportions, they demonstrated varied differences (see Table 29 through Table 35). However, some of the tests merited further consideration. For example, most of the principals in low-performing countries reported providing parents or guardians with information on school and student performance significantly more than school leaders in the U.S. Additionally, principals in the U.S. reported significantly less time spent in checking for mistakes and errors in administrative procedures and reports and resolving problems with the lesson timetable than many of the selected countries. At first glance, these would appear to be advantageous differences based on the inverse relationships of these characteristics to student achievement. However, the researcher was uncertain whether this signified that school leaders in the U.S. spent time on other more important tasks or other menial tasks. The findings in the category of frequency of school tasks suggested the multitude of tasks required of principals constrained principals’ effectiveness in performing more important tasks and limited the autonomy of teachers. The researcher recommended that school leaders prioritized tasks that demonstrated a significant positive relationship to student achievement, such as those involving guiding teachers in providing feedback to each other, fostering common beliefs about teaching and learning, and assisting teachers in building strong teacher-student relations.

Teachers’ Instructional Beliefs and Pedagogical Practices

In order to determine the relationship between student achievement and teachers’ instructional beliefs and pedagogical practices, the following categories were selected:

teachers' personal beliefs on teaching and learning, teachers' self-efficacy, distribution of class time, and teachers' use of assessment practices. Of the 12 characteristics tested regarding teachers' self-efficacy, 11 demonstrated a significant ($p \leq 0.05$) inverse relationship to student achievement (see Table 14). In the difference testing, the U.S. generally displayed greater self-efficacy than high-performing countries and less self-efficacy than the lowest performing countries (see Table 36 through Table 45). The researcher suspected this may partially be due to the heightened levels of collaboration in high-performing countries. Teachers in the U.S. offered each other little feedback, and in the researcher's experience, tended towards isolation. This isolation may have led teachers to feel a heightened sense of independence and competency. Another explanation for the inverse relationship between student achievement and teacher self-efficacy could be a lack of self-reflection in teachers from lower-performing countries. The researcher believed in the importance of working in a collaborative environment and suggested that teachers in the U.S. should be encouraged to engage in frequent self-reflection.

Another noteworthy finding regarding teachers' instructional beliefs and pedagogical practices was that half of the characteristics tested for teachers' use of assessment practices demonstrated a significant inverse relationship with student achievement. Additionally, difference testing revealed that significantly more teachers in the U.S. reported developing and administering their own assessments 'frequently' or 'in all or nearly all lessons' than every other tested country but Brazil. As this characteristic was negatively correlated with student achievement (r = -0.566), the researcher recommended the U.S. limit the amount of assessments and ensure that teachers were

trained to use assessments appropriately and effectively. Two other characteristics in this category that were inversely related to student achievement were the proportion of teachers who reported they let students evaluate their own progress 'frequently' or 'in all or nearly all lessons' (r = -0.593) and the proportion of teachers who reported they observed students when working on particular tasks and provided immediate feedback 'frequently' or 'in all or nearly all lessons' (r = -0.555). In both of the difference tests of these characteristics, teachers in the U.S. reported engaging in these assessment practices significantly more than the top four performing countries.

The inverse relationships of these two characteristics and student achievement initially seemed contrary to the research of Marzano (2003; 2006; 2007) and Hattie (2009; 2012), yet were valid when examined more closely. Hattie's (2009) synthesis of over 800 meta-analyses ranked feedback as the number ten influence on learning, with an effect size of 0.74 (p. 297), but cautioned that the key to feedback was that students were able to interpret and act upon the feedback in a meaningful way (p. 174). Marzano (2003) also stressed the effectiveness of feedback that was timely and specific to the content being taught. Additionally, Hattie (2009) ranked self-reported grades as the number one influence on learning, with an effect size of 1.44 (p. 297), but he also stated that expectations of success could be set too low, which resulted in students performing to the lowered expectations of their ability (p. 44). In light of the research of Hattie (2009; 2012) and Marzano (2003; 2006; 2007), the researcher believed teachers in lower performing countries may not be performing these assessment tasks appropriately. The researcher also wondered if teachers in the U.S. and low-performing countries were trying to implement too many strategies at the expense of implementing them well. The

researcher recommended teachers in the U.S. receive additional training on how to use assessment strategies more appropriately and effectively.

Recommendations for Further Research

A direction for future studies would be to perform the Pearson Product Moment Correlation analysis to determine if relationships exist between the factors of school working conditions and learning environments and student achievement based on both the math and science portions of the PISA. The current study utilized the reading scores as the indicator of student achievement, so adding the math and science scores would assist in determining if the relationships were consistent.

Additionally, findings in this study indicated a significant inverse relationship between teacher self-efficacy and student achievement. The researcher believed this relationship was dependent on unknown factors and investigating those factors could reveal important differences in teaching and learning, internationally, as well as provide possible areas of improvement for low-performing countries.

Finally, this study indicated that educators in the U.S. were not effectively utilizing research-based assessment practices. Further studies could investigate how teachers in the U.S. use research-based assessment techniques in an effort to improve assessment in schools in the U.S. Although there were numerous studies regarding assessment techniques at the time of this study, the U.S. would benefit from a comprehensive study that does not simply ascertain if the assessment strategies were being used, but evaluated whether teachers in the U.S. were implementing the strategies correctly.

Conclusion

The researcher designed this study to determine possible international differences in the factors of school working conditions and learning environments that contributed to academic achievement. The researcher utilized a Pearson Product Moment Correlation Coefficient test to analyze relationships between student achievement and the factors of initial teacher education and professional development; teacher appraisal and feedback; school climate; school leadership; and teachers' instructional beliefs and pedagogical practices. Additionally, the researcher used a *z*-test for difference in proportions to determine potential differences within those factors between the U.S. and other countries. Results from this study partially supported the researcher's hypotheses and highlighted various areas of potential improvement for education in the U.S.

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Vitae

Melissa A. Allen

EDUCATION

Ed.D., Instructional Leadership — Expected Completion 2016
Lindenwood University

M.A.E., Elementary Education — 2010
Truman State University

B.S., Psychology — 2010
Truman State University

PROFESSIONAL EXPERIENCE

Elementary Teacher (Grades 3-5) — 2011- Present
Northwest R-1 School District

Tutor (K-12) — 2011
Sylvan Learning Center

Additional Student Instructor (Grades 2-4) — 2011
Lindbergh Schools

VOLUNTEERISM/ ACTIVITIES

Cedar Springs Positive Support Team (Data Team) — 2013- Present

Northwest R-1 Tax Levy Committee — 2014- 2015

Northwest R-1 Key Communicator Committee — 2013- 2015

HONORS

President's Recognition Award — 2010
Truman State University

PROFESSIONAL CREDENTIALS

Career Continuous Professional Certification in Elementary Education