STATEWIDE MANDATORY REMEDIATION POLICIES:
NATIONAL, STATE, AND INSTITUTIONAL PERSPECTIVES

by

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Despite uncertainty related to student outcomes resulting from remediation (Bettinger & Long, 2009), eleven states mandate remedial education through common placement testing and standardized cutoff scores rather than permitting individual postsecondary institutions to establish remediation guidelines. Colorado, in particular, offers an exemplary look at how such policies have manifested on the state level. This policy analysis used a fixed effects model on panel data in order to determine the impact of statewide mandatory remediation policies on college graduation and persistence rates for states as a whole as well as at the two-year and four-year institutional levels. Examining the larger national context revealed statewide mandatory remediation policies offered no significant impact on state-level college degree completion or retention rates. A closer look at the state of Colorado showed similar null effects on community college graduation rates. However, institutional retention rates were significantly improved at all levels of higher education as a result of Colorado’s statewide mandatory remediation policy.
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CHAPTER I
INTRODUCTION

College attainment has become more critical to national success than ever before. The fastest growing job sectors in the United States’ economy now require workers to have at least some education or training beyond high school. Estimates project that by 2020, the United States could face a shortfall of 14 million workers who have the knowledge and skills necessary to compete for middle-income jobs in a global economy (Carnevale & Desrochers, 2003). Whereas the United States was once the world leader in offering college opportunity to its citizens, several countries have now overtaken the U.S. in this area. The educational attainment of the young workforce in the United States (ages 25 to 34) currently ranks ninth among industrialized nations (Organisation for Economic Co-operation and Development, 2010). Unless the educational achievement of the young population improves, the competitiveness of the U.S. workforce is projected to decline.

In the face of increasing pressures to produce more qualified workers, completion rates for associate and bachelor’s degree programs have stalled over the past decade, and wide gaps remain in college completion by ethnic and income groups (Callan et al., 2006). In the next 15 years, minority groups with the lowest average levels of education are projected to grow rapidly, while the baby boomers, who are the most highly educated generation in U.S. history, will retire in record numbers, leaving an even larger gap between educated and non-educated workers.
One way to improve the quality of the workforce is to redefine secondary education in America. In the past, states have viewed high schools as preparing most students for work while preparing some students for postsecondary education. Increasing technological and educational demands on the contemporary workplace have made this stance irrelevant today. The knowledge and skills necessary for today’s workforce are the same as those needed to succeed in postsecondary education. As a result, some high schools are attempting to provide all students with a college readiness education (Callan et al., 2006).

Despite the focus on revamping K-12 curricula and record numbers of high school students enrolling in postsecondary education, a significant number of students transitioning to postsecondary education are underprepared to do college-level work (Greene & Forster, 2003) and must complete remedial education courses (Jenkins & Boswell, 2002). Estimates indicate 35-40 percent of first-time college students are placed into remediation each year (Calcagno & Long, 2008), yet the effectiveness of remedial education has been questioned (Bettinger & Long, 2009). At an estimated national cost of $2.3 to $2.9 billion annually (Strong American Schools, 2008), the growing practice of remediating students at public postsecondary institutions has come under tremendous scrutiny, especially as state governments and higher education systems struggle to combat the current economic crisis.

Amidst increasing external pressures to perform, higher education in the United States has struggled to maintain its identity, and consequently, college remediation efforts have floundered. On one side, scholars contend that higher education should maintain its rigor by holding incoming students to elevated standards (Harwood, 1997; Marcus, 2000;
Trombley, 1998). Advocates of this viewpoint claim that incoming students lacking the academic ability to meet set standards for completing college-level work should not be admitted into college in the first place (Bennett, 1994; MacDonald, 1999; Traub, 1995). Using this argument against open admissions, students needing remediation would be ineligible to attend many postsecondary institutions across the country. Opponents, including President Obama, view higher education as the means for creating a new 21st century economy. To that end, remedial education would provide opportunities for all citizens, particularly marginalized subgroups of students, to achieve academic success. Advocates for college remediation point out that students of color, students from less affluent families, and students for whom English is a second language are greatly overrepresented in remedial courses. Thus, policies that prevent delivery of remedial education to these students would significantly reduce the likelihood that such students would ever obtain bachelor’s degrees (Jenkins & Boswell, 2002). With no resolution, policymakers continue to deliberate the purpose of higher education in the United States. Should college opportunity democratize our country by providing education for all, or should postsecondary education maintain the traditional standards of academia? As noted in a *Time* magazine feature, eliminating remediation in higher education could “effectively end the American experiment with mass postsecondary education” (Cloud, 2002, p. 1).

Although much has been written about this controversy, little substantial empirical evidence exists to support or refute the impact of remediation on student outcomes. Grubb (2001) stated, “Unfortunately, while debates for and against have been vociferous, the effectiveness of these programs has not been visible as an issue.
Relatively few evaluations of remedial programs have been conducted, and many existing evaluations are useless” (p. 1). On one hand, Bettinger and Long (2004) claim students enrolled in remedial coursework have more negative outcomes than those not enrolled in these courses, while contradictory evidence shows that successful completion of these courses may result in educational outcomes that are comparable to students not requiring remediation (Bahr, 2008). Incongruent substantiation leaves policymakers wondering how to attend to underprepared students, especially when state governments are looking for ways to prepare the workforce of the 21st century.

Despite this fact, several states have responded to the call for academic rigor in higher education by enacting policies that mandate college remediation for students not meeting specific benchmarks. Most public postsecondary institutions offer remedial coursework to incoming students who do not perform well on college entrance exams or standardized tests, but typically these policies and cutoff scores vary by institution. Eleven states, however, mandate college remediation statewide. The following policy analysis seeks to evaluate the impact of statewide mandatory remediation policies on student retention and college degree completion through national, state, and institutional perspectives.

**Policy Background**

**The College Readiness Gap**

The college readiness gap represents the difference between the skills and knowledge that students gain in high school versus the skills and knowledge that colleges and universities expect. Every year in the United States as many as 40 percent of first-year college students (Calcagno & Long, 2008) discover that, despite meeting eligibility
requirements to attend college, they are not adequately prepared for the academic rigor of postsecondary education. After enrolling in their schools of choice, these students learn that they must take remedial or developmental courses in reading, writing, or mathematics, which typically do not earn college credits and require additional fees beyond regular tuition expenses. Most often, such students tested below a predetermined benchmark, set either by the postsecondary institution or the state, and were identified as needing remedial education in order to improve their basic knowledge and skills. Even those students who prepared for college meticulously, including taking Advanced Placement (AP) and International Bacclaureate (IB) courses, find themselves, often after they arrive, deemed as unready to take college-level classes. Despite seemingly supporting the academic success of incoming students, higher education has come under fire in recent years for enrolling students under the false pretense of college readiness (National Center for Public Policy and Higher Education, 2010). Higher education officials counter that K-12 institutions are at fault for misleading high school graduates about their preparedness for college-level work. Policymakers are left to sort out both who should be held accountable and who should pay for remediation.

One misconception is that earning a high school diploma means that graduates are ready for college. Even states with high school exit exams or other standardized evaluations acknowledge that proficiency is measured at the 8th to 10th-grade levels due to pressures to graduate as many students as possible (National Center for Public Policy and Higher Education, 2010). Hence, a high school diploma does not currently indicate college readiness, even when “high stakes” testing is involved.
Along with the devaluing of the high school diploma, the prescribed college preparatory curriculum of most high schools is not sufficient for postsecondary readiness. Approximately half of the students entering less selective four-year institutions must take remedial coursework before being college ready, yet they attained the required combination of grade-point average, college admission test scores, and high school diploma (National Center for Public Policy and Higher Education, 2010). Hence, it cannot be assumed that course completion and standardized assessment scores alone define college readiness. Attewell et al. (2006) distinguished the effects of poor high school academic preparation from the effects of taking remedial coursework in college and determined that most of the gap in college graduation rates reflected mainly preexisting skill differences carried over from high school, not necessarily the act of taking remedial courses in college.

Policymakers must address K-12 and postsecondary alignment efforts if they are ever to improve successful transitions between high school and college. In the last two decades, scholars have pushed for greater articulation from kindergarten through college. Often labeled as K-16, P-16, or P-20 initiatives, states are engaging in debate about how to merge and standardize the leap from high school to college. The Education Commission of the States claimed that thirty states had established P-16 initiatives, but Brown and Niemi (2007) found that only eleven states had actually aligned their secondary school assessments with postsecondary institutional offerings.

Some states have unified the entire structure of education through legislative efforts. For example, in 1999 Florida created a single, statewide K-20 Board of Education with broad authority. The state established a unified K-20 accountability
system that included extensive student-level record systems for K-12 and postsecondary education. Colorado has also established a P-20 educational system in an effort to improve articulation among education sectors. Initial evidence suggests that these structural changes in state governance and information sharing may be improving policy analysis in the state, particularly related to the transition between high school and college (Venezia et al., 2005).

Another tactic for closing the gap between high school and college is to encourage collaboration among secondary and postsecondary educators. For example, The Ohio State University conducted joint research with high school teachers on language arts alignment. Particularly, instructors at both levels compared feedback on individual student writing assignments in an effort to merge more closely together (Acker & Halasek, 2008). As a result, similar collaborative projects have emerged across the country. In 2006, the Texas Legislature passed House Bill 1, sweeping education-reform legislation that required vertical teams of faculty from K-12, community colleges, and four-year institutions to develop and recommend college-readiness standards in English, mathematics, science, and social studies for statewide adoption. Additionally, programs that allow for concurrent enrollment are increasing rapidly as they provide the flexibility for high school students to take college courses while enrolled in secondary school. Research shows that the transition to higher education is smoother for these students, thereby reducing the need for remediation, but this could be because of the students’ already elevated academic aptitude and motivation (Hughes, 2010). Regardless of the specific strategy, states establishing collaborative communication among education
sectors and instituting clear standards and expectations will be more likely to close the gap between high school exit and college entrance.

Other states have implemented early assessment of high school students in an effort to reduce the need for remediation altogether. For example, several states, such as California, Florida, Ohio, Kentucky, Oklahoma, and North Carolina, have begun college placement testing while students are still in 10th or 11th grade (Collins, 2009). With assistance from high school teachers and counselors, students who appear not to be on track to be college-ready receive remediation before graduating from high school and enrolling in a postsecondary institution. As long as students graduate high school underprepared, remediation will continue to be pervasive, so policies that lower the need for remediation in the first place could make the greatest difference in improving college attainment rates.

Regardless of these initiatives, curricular sequencing and cohesiveness across secondary schools in the United States is minimal (Conley, 2005). The high school curriculum still remains largely disconnected from the freshman and sophomore postsecondary curriculum, not to mention a consistent vision of liberal arts education that would help students prepare for college coursework. For example, California high schools preparing students for college concentrate on literature in English coursework, whereas beginning English courses in California community colleges focus on grammar and writing, and the University of California and California State University systems emphasize rhetoric (National Center for Public Policy and Higher Education, 2009). Until greater curricular alignment is achieved, students preparing for postsecondary education will most likely continue to miss the mark of college readiness.
In recent decades, the Advanced Placement (AP) program has most closely provided nationally aligned standards between K-12 and higher education, but course constructs are dictated primarily by colleges rather than a true collaborative effort (National Center for Public Policy and Higher Education, 2009). The International Bacclaureate (IB) program attempts to align high school and college curricula, but its scope is limited in the United States. These programs help those who attend selective colleges and universities, but not the vast majority of high school students who attend nonselective or open-access institutions, such as community and technical colleges. In addition, a great divide exists in high school curricula between the academic rigor of AP and IB programs and regular college preparation courses. Ironically, some of the fastest growing courses in high school are college preparatory courses, such as AP, while the most rapidly growing courses in college are remedial education classes. This disparity could suggest that academically advanced students are more closely aligned with higher education through AP and IB while less academically adept students are becoming even more disengaged (National Center for Public Policy and Higher Education, 2009).

Overall, national policymaking for K-12 and postsecondary education has been more concerned with increasing access to college than with developing aligned, rigorous curricula that can better prepare large numbers of students for success at the college level. Instead, high school and postsecondary professionals should be equally focused on preparing students to gain the skills and knowledge necessary for college success and degree completion.
Does Remediation Work?

Despite P-20 curricular alignment efforts, remediation is still pervasive; however, whether remedial education helps or harms students is debatable. On the one hand, advocates claim that students gain academic skills necessary to excel in college and that remediation may serve as a tool to integrate students into the school population (Soliday, 2002). Remedial classes may also offer a safe environment in which students receive other kinds of assistance, such as particularly attentive instructors, tutoring services, and support from similarly situated peers (McCabe & Day, 1998). From a more global perspective, remediation allows greater access to education for those who may otherwise be considered ineligible, which improves economic outcomes and societal benefits (Lavy & Schlosser, 2005; McCabe & Day, 1998).

To the contrary, remediation may have an opposite effect. Some researchers claim that enrollment in remedial coursework delays time to degree completion (Attewell et al., 2006; McCormick, Horn & Knepper, 1996) and that remediated students are less likely to graduate than non-remediated students (Adelman, 2006). The literature also suggests that stigmas attached to underprepared students can actually harm them (Basic Skills Agency, 1997). In other words, remediation could negatively affect outcomes by labeling students as poor performers. Finally, peer effects cannot be overlooked. Recent research suggests that students who interact with peers who are higher achievers than themselves tend to improve (Hoxby, 2000; Sacerdote, 2001; Zimmerman, 2003;). Thus, grouping lower-ability students in remedial courses could produce negative peer effects among those students. In contrast, students not placed into remediation could benefit
from positive peer effects by interacting with higher ability students in non-remedial courses.

Regardless of the viewpoint, the effectiveness of remedial education has risen to the attention of policymakers. As state officials and higher education administrators look to maximize budgets while also optimizing college attainment levels, the question of which programs yield the greatest benefits has become paramount. Restrictive admissions and placement policies are likely to have widespread effects on many parts of higher education (most likely resource-strapped community colleges) and long-term labor market quality. As a result, examining whether remedial education is providing the outcomes desired for the amount of money being invested has risen to the attention of both educational and political leaders.

**Remedial Education is Expensive**

Policymakers are also increasingly concerned about the growing costs of remedial education. Opponents of remediation argue that postsecondary institutions should not be held accountable for closing the achievement gap between high school and college. Public colleges estimate spending between two and three billion dollars each year on providing supplementary education to those who should have already received the instruction via publicly funded secondary schooling (Breneman & Haarlow, 1998; Strong American Schools, 2008). This burden is particularly heavy for community colleges as states increasingly move away from allowing remedial education at four-year institutions.

Remediation is also expensive for students. Students required to take remedial coursework must pay additional tuition dollars for these classes without receiving college credit. The coursework adds a financial burden and extends the time to degree
completion for many students who would already struggle to finish their education. Consequently, experts argue that remedial education lowers educational expectations and self-esteem while increasing opportunity costs through foregone earnings (Bettinger & Long, 2006). With little empirical evidence for the effectiveness of remedial education, policymakers question whether the costs of remediation outweigh the benefits.

**Purpose of the Study**

As a result of an increasing awareness of the issue of remedial education at the postsecondary level, states are developing policies to address the difficult transition between high school and college. In order to attend to the growing numbers of undergraduates entering college with less than collegiate skill levels in reading, writing, and mathematics, particularly low-income students who attend community colleges, state policies are increasingly governing the use of placement tests to detect academic deficiencies and how remedial instruction is conducted to bring student skills to the college level. Remedial courses are not permitted at public institutions in two states, and many states have confined developmental classes to community colleges rather than four-year public institutions. Other states have imposed or are considering limits on the government funding of remedial coursework (Bettinger & Long, 2009). Twenty states currently have a statewide policy that governs college placement for all public institutions (Ewell, Boeke, & Zis, 2008). Eleven of those states have established common tests for remedial placement decisions as well as standardized cutoff scores to be used for assignment to remediation. Despite the lack of evidence for these statewide mandatory remediation policies, or even remedial coursework in general, growing numbers of states are tackling the issue through similar standardized legislation.
To assist states interested in adopting standardized policies for incoming postsecondary students, this study sought to provide insights by asking: *What is the impact of statewide mandatory remediation policies on college student retention and degree completion for two-year and four-year postsecondary institutions at the national, state, and institutional levels?* The study examined how statewide remediation policies affect student outcomes nationally by investigating longitudinal data for college retention and degree completion rates for each state. State outcomes were then compared prior to and after the implementation of the policies in order to determine any resulting impact.

In an effort to more deeply understand the possible effects of these policy mandates, this study also explored one state’s journey into statewide mandatory remediation. Colorado implemented a statewide remediation policy within the last decade. Using eight years of longitudinal data on college student retention and degree completion, policy effects were explored for the state in general as well as for public two-year institutions, public four-year institutions, and each specific institution. As a result, the following study reveals the effects of statewide mandatory remediation policies spanning from national and state levels down to the institution itself, providing policymakers with an expansive perspective on such initiatives.

**Significance of the Study**

As policymakers attempt to smooth the transition from high school to college, statewide mandatory remediation policies have emerged across the country as a plausible solution. Before additional states adopt these requirements, however, policymakers should consider the effects of such mandates. Ultimately, states must determine whether to allow placement decision making to remain at the postsecondary institutional level or to direct remediation efforts statewide in an effort to support student retention and college
degree completion. As state higher education funding plummets nationwide, initiatives that keep students in school become more critical to the financial health of postsecondary institutions. Furthermore, families struggling to pay for an increasingly expensive college education must strike a balance between expediting degree completion and achieving academic success. Students who are required to take remedial coursework, often at an added cost with no credit, deserve to know how these classes will help them to succeed when, on the surface, they are merely delaying the end goal of obtaining a degree.

While this study does not address specifically whether remedial education coursework helps individual students succeed, it does explore whether sweeping statewide legislation which mandates remediation based on cutoff scores from standardized tests impacts retention and degree completion rates. Findings from this study offer new insights regarding the effectiveness of remediation policies that should provide evidence for policymakers who are considering moving forward with such statewide mandates.
CHAPTER II
REVIEW OF LITERATURE

Arguments promoting or opposing remedial and developmental education can be traced throughout the entire 400-year history of American higher education. As forefathers established colleges along the eastern seaboard, a debate ensued about the appropriateness of providing coursework to accommodate learning deficiencies of incoming college students. Should only the most prepared students be provided with advanced education or should college opportunity be provided to all? Today’s debate continues to examine the ideological purpose for higher education in the United States. Policymakers have responded to this debate through a variety of stances, hoping to retain higher education quality, maintain universal access, and improve student outcomes in postsecondary education.

Historical Background

The founding of America’s first colleges was driven by the desire to foster the development of leaders in an effort to “spell the difference between civilization and barbarism” (Rudolph, 1990, p. 6). These colleges aimed to preserve the cultural norms imported by men educated at Cambridge and Oxford, develop a learned clergy to uphold Christian virtues, and create an elite ruling class who would bring order to the colonies (Rudolph, 1990). As a result, the early curriculum of colonial higher education included rhetoric, classics, and biblical studies. According to Brubacher and Rudy (1976), higher education was intended for “preserving, not reconstructing” (p. 10) established order in
the colonies. Educating the masses was by no means part of the postsecondary agenda of the time.

Over time, however, a new vision for higher education arose from revolutionary exchanges and increasing religious diversity. As the colonies broke from England, a more secular curriculum erupted that broadened to include the sciences, social sciences, and fine arts. The role of education shifted from training an elite populace to one that better represented the spirit of democracy by educating a broader segment of society (Jeynes, 2007). The transition to teaching individuals from more humble origins, whose academic abilities and preparation varied widely, obligated educators to develop “preparatory programs” that would bring students to the appropriate skill level necessary for college-level learning (Rudolph, 1990).

Early American colleges maintained little consensus as to what adequate preparation for college included. Partly because most learning prior to college took place in the home, and partly due to inconsistent admissions practices, colleges themselves struggled to establish clear standards for incoming students. Compounding matters, postsecondary institutions relied heavily on student enrollment for survival, much like American colleges today. As a result, “conditional” admissions appeared for students requiring some form of “preparatory” or “remedial” instruction. For example, in the 19th century, Harvard determined that more than half of its freshmen students required tutoring in Latin to improve their verbal fluency and written competency (Boylan & White, 1987). Consequently, preparatory programs or departments were institutionalized on many college campuses.
Despite the existence of remedial courses in higher education dating back to Harvard in 1642, the University of Wisconsin (UW) is credited with creating the first formal preparatory program in postsecondary education. Established in 1849, the Department of Preparatory Studies instructed students in study skills and provided remedial courses in reading, writing, and math. In 1865, only 41 out of 331 students admitted to the University of Wisconsin were enrolled in credit granting courses (Casazza & Silverman, 1996). The UW program served as a model for other programs across the country. By the end of the 19th century, nearly 40 percent of all first-year students in the nation were enrolled in remedial courses, and approximately 80 percent of postsecondary institutions maintained preparatory departments (Ignash, 1997). Over a century later, these numbers reflect our current state of remediation in higher education, in which approximately 35-40 percent of first-year students enroll in remedial courses in 76 percent of postsecondary institutions (National Center for Education Statistics, 2003).

Expansion of colleges in western states further necessitated the existence of preparatory programs. In addition, post-Civil War urbanization, industrialization, immigration, and emancipation of slaves affected the purpose of higher education. Language differences, poor schooling backgrounds, and numerous cultures forced the United States to redefine the traditional scope of postsecondary education. The Morrill Acts of 1862 and 1890 broadened access to college for a more diverse population and introduced a vocational focus for higher education (Urban & Wagoner, 2009). Curricula began to emphasize practical knowledge over a classical education, promoting courses in agriculture, home economics, engineering, and business. Even with this new orientation toward providing a skilled workforce, remedial instruction was necessary to address basic
skills deficiencies among students. Less-selective requirements for admissions in these institutions further established the need for better preparing students to meet the rigors of higher education. By 1889, postsecondary institutions reported 80 percent of their campuses offered preparatory programming for incoming students (Arendale, n.d.). By the start of the 20th century, courses in remedial reading and study skills became common as 350 colleges offered courses in “how to study” (Casazza & Silverman, 1996).

At this time, universities began a variety of initiatives to support incoming poorly prepared high school students: mandating enrollment in remedial courses, initiating pre-college summer study programs, providing conditional admissions, and reducing course loads. Despite these efforts, the gap between secondary school and postsecondary expectations persisted. As a result, university administrators began pushing to develop junior colleges. By dropping the first two years of instruction, which often entailed remedial education, four-year colleges could remain “true research and professional development centers” (Cohen, 2009, p. 110). Prominent educators from Harvard, Columbia, Stanford, and the University of Michigan argued that junior colleges could attract more students to postsecondary education, including those who previously may not have considered attending college. Proponents argued that a shorter time span of college would also make it easier for students to terminate college attendance after only two years of study. Despite the fact that many of these junior colleges provided a “sorting” function in education by advising students away from continuing their education beyond two years, junior colleges did provide opportunity for students previously denied access to higher education. By 1930, over 70,000 students were
enrolled in 450 junior colleges in all but five states across the U.S. (Cohen, 2009).

Consequently, remedial education became the business of junior colleges.

The first World War, the GI Bill, and the Civil Rights Act of 1964 advanced the belief that all individuals, regardless of background, age, or station in life, could access higher education. Education became a national imperative to ensure U.S. security, economic stability, and global competitiveness. By 1947, the GI Bill brought over one million servicemen into postsecondary education, as many of two-thirds of whom did not have adequate study skills to succeed in college (Clowes, 1980). Consequently, guidance centers, tutoring services, and reading and study skills programs became widely available on college campuses.

In an effort to support education for all, the 1960s brought open admissions policies. The Carnegie Commission on Higher Education urged junior colleges to open its doors to all graduating high school students and other qualified individuals. According to Cohen and Brawer (2003):

Community colleges reached out to attract those who were not being served by traditional higher education: those who could not afford tuition; who could not take the time to attend a college full time; whose ethnic background had constrained them from participating; who had inadequate preparation in the lower schools; whose educational progress had been interrupted by some temporary condition; who had become obsolete in their jobs or had never been trained to work at any job; who were confined to prisons, physically disabled, or otherwise unable to attend classes on campus; or who were faced with a need to fill increased leisure time meaningfully. (pp. 28-29)
In other words, junior colleges were to become all things to all people. They were to bear the brunt of inadequate preparation as the consequence of open admissions policies so that more prestigious universities could enroll a larger share of academically prepared students (Geiger, 2005). Over time, community colleges were criticized for delivering ineffective programs when the reality was that remedial and developmental education for all redefined their mission and, some would argue, made it more difficult to deliver a quality education.

Early studies of remedial programs in community colleges found them to be merely “watered down” curricula taught by faculty with no training, experience, or commitment to remedial instruction (Roueche, 1968). As many as 55 percent of remedial instructors in California had less than two years of experience, which confirmed other research indicating that the least experienced instructors were likely to be found in remedial settings. Even though changes to remedial instruction have occurred over time, such as a more developmental approach to learning, little research evidence demonstrates the effectiveness of community colleges to adequately serve the needs of underprepared students (Callahan & Chumney, 2009).

History demonstrates how remedial and developmental education emerged in American colleges. Inconsistent pre-college requirements of the 18th century, heightened pressure to increase enrollment for emerging institutions of the 19th century, and concern for national security and global competitiveness of the 20th century all contributed to the expansion of remedial and developmental education in colleges and universities across the United States. Development of junior and community colleges stemmed directly from early efforts to close the gap between secondary and postsecondary education.
Regardless of the rationale for its growth, remediation in postsecondary education began to obscure the purpose of college as a place for “higher learning.”

**The Policy Debate**

Today, state policymakers continue to debate the role of remedial education in the success of students as well as higher education in general. Remediation primarily aims to provide underprepared students with the skills necessary to complete and succeed in college. However, remediation also serves several institutional needs. First, it allows colleges and universities to offer educational access to growing numbers of students, many of whom may not have been eligible otherwise. Individual departments, particularly English and mathematics, generate enrollment by providing remedial classes. In addition, separating weaker students into remedial courses allows colleges and universities to protect institutional selectivity and regulate entry to upper level courses. Remediation is also used as a tool to integrate students into the school population, although some contend it may have the opposite effect (Soliday, 2002).

With a more fully developed postsecondary system as well as an increased need for an educated workforce, policymakers are trying to understand who should be remediated, where remedial education should take place, how to measure its effectiveness, and how to pay for remediation services (Parker, Bustillos & Behringer, 2010). Recent studies have attempted to more clearly define the impact of remedial and developmental education (Bettinger & Long, 2009, Callahan & Chumney, 2009), but little data has been collected to accurately measure the scope of these programs (Grubb, 2001). Regardless, the Education Commission of the States (2010) suggests that states and higher education systems report on three main areas – participation, effectiveness,
and cost – in order to improve and eventually reduce the need for remedial services, and as a result, to increase college completion rates.

**Participation in Remedial Education**

Recent policy debates have elevated concerns about increasing numbers of underprepared students (Kozeracki, 2002; Soliday, 2002). In actuality, reviewing data shows that the percentage of students enrolled in remedial courses today does not significantly differ from remedial course taking 100 years ago (Ignash, 1997; National Center for Education Statistics, 2003). Phipps (1998) and Merisotis and Phipps (2000) reviewed the controversy over remedial/developmental coursework in college by providing a historical context. They noted that remedial classes have been a regular part of higher education at all levels of institutional rigor from the Colonial period to the present. In fact, the authors claim, the most recent political movement against remediation was not due to increasing remedial classes on college campuses. Instead, the proportion of institutions offering such courses, as well as the proportion of students taking them, has remained stable throughout history. Only recently, with policies erupting in the late 1990s, have remedial courses been removed from state universities.

Estimates claim as high as 40 percent of traditional college students enroll in remedial courses (Attewell et al., 2006) in 76 percent of postsecondary institutions (NCES, 2003). Most remediation is provided by non-selective public institutions, the point of college entry for 80 percent of four-year students and virtually all two-year students (Bettinger & Long, 2006). Attewell et al. (2006) found that two-year colleges remediate much more than four-year institutions, and selective colleges remediate the
least. For this reason, it is important to analyze policy initiatives based on institutional type and level in order to examine the discrepancies.

According to the national analysis conducted by Attewell et al. (2006), mathematics is the most common remedial subject, with 28 percent of students taking courses in that area. Remediation in reading (9 percent of all students), writing and comprehensive language arts (18 percent of all students), and other academic areas (9 percent of all students) also occurs.

One controversy surrounding remediation centers on students taking multiple remedial courses. According to Attewell et al. (2006), 42 percent of two-year college students took no remediation, 44 percent took between one and three courses, and only 14 percent enrolled in more than three remedial courses. At nonselective four-year colleges, 69 percent took no remediation, 26 percent enrolled in between one and three courses, and 5 percent took more than three. Even though the public often perceives that large proportions of students are delayed by remedial courses in four-year colleges, Attewell et al. (2006) point out that no more than 5 percent of traditional undergraduates at nonselective four-year colleges take more than three remedial classes.

Remedial courses are taken by students from all geographic and socioeconomic backgrounds. Attewell et al. (2006) found that 40 percent of students who took remediation in college previously attended a rural high school, with 38 percent of students from suburban high schools and 52 percent of students from urban high schools. One may suspect that students from the lowest quartile of socioeconomic status (SES) were more likely to take remedial classes (52%), but nearly a quarter (24%) of students from the highest quartile SES families also enrolled in remedial coursework (Attewell et
al., 2006). Hence, remediation in college is not at all limited by the geographic region or the wealth of a student.

Most remedial students are returnees or delayed entrants to college, aged 20 years old or older (Merisotis and Phipps, 2000; Phipps, 1998), yet most of the attention, policies, and practices are geared toward recent high school graduates transitioning to college (Fulton, 2010). Adult developmental education students often have different needs and skill levels than recent high school graduates. They often take college courses to enhance their workforce skills, but do not necessarily seek to obtain a degree or certificate, or to transfer to a four-year institution (Attewell et al., 2006). For this reason, some experts claim that measures of the effectiveness of developmental education that rely on graduation rates alone could be distorting the full picture of college remediation (Bailey, Leinbach, & Jenkins, 2006).

Despite large numbers of remediated students over the age of 20, policy conversations have centered primarily on the college readiness gap for those exiting high school and entering college for the first time. In recent years, states have strengthened high school curricula and graduation requirements in an effort to ensure college readiness. As Adelman (2006) determined in The Toolbox Revisited, students who completed a more rigorous high school curriculum were better prepared for college-level work, requiring few to no remedial classes and graduating within 150 percent of degree completion time. A study by the Ohio Board of Regents (2002) found that students who had completed a college preparatory curriculum in high school were half as likely to need remediation in college when compared to students without an academic core curriculum. Unfortunately, 36 percent of first-year students age 19 or younger attending a public Ohio
postsecondary institution graduated from high school without such a curriculum, exactly the same proportion of students who enrolled in at least one remedial course in their first year of college. Venezia, Kirst, and Antonio (2003) detail how differences between what high schools expect and what colleges demand cause significant challenges for student success in postsecondary education.

On the contrary, Attewell et al. (2006) showed that many relatively skilled students take remedial coursework. Among students who took the most advanced curriculum in high school (the top quartile), 14 percent took some remedial coursework in college, but 32 percent of students in the lowest skills test quartile took no remedial coursework. Considerable variability or arbitrariness in the assignment of students to college remediation raises the question of whether the graduation and college entrance policy changes are meeting their intended goals. As a result, a growing number of states are focusing on measuring student competencies through college-readiness assessments or high school exit exams as well as standardizing college placement policies statewide. For example, President Obama’s blueprint for reauthorizing the Elementary and Secondary Education Act includes a Core State Standards Initiative that emphasizes college-readiness standards.

Another policy concern which affects remediation numbers is the practice of open admissions. The majority of colleges in the United States are unselective, meaning they admit almost every high school graduate who applies and can pay tuition (Attewell et al., 2006). In order to allow open access, institutions often require weaker students to take remedial classes so that they are ready for college-level coursework. In this way, remedial education acts as a gatekeeper and a quality control for higher education.
Students passing these courses continue into regular college-level classes, while those who do not succeed in remediation either drop out or are academically terminated. As Attewell et al. (2006) points out, colleges are criticized for wasting the time of students who fail to overcome these hurdles despite their lack of basic skill competency. The public has scrutinized these institutions for remedial education as an indication of a lack of standards, when in fact remediation is a mechanism for setting a fundamental baseline for incoming students. If the objective of higher education in America is to offer educational opportunity to all, even those with a one-in-four chance of graduating, then supporters argue that college remediation should be viewed as a form of quality control rather than a detriment to education.

**Delivery of Remedial Education**

The standard course format for remedial education includes several classroom sessions per week and an additional lab component providing tutoring and computer-based practice (Boylan, 2002). Often, developmental education class sizes are lower than college-level courses to allow for more personalized attention (McCusker, 1999). Traditional remedial course delivery predominates, but several new course formats have erupted recently, including self-paced, tutor-based, online, accelerated, intensive summer, contextualized, personalized, combined reading-writing, combined remedial and college English, study skills, off-site, alternation of instruction and application, and instruction following a quarterly rather than semester schedule (Perin, 2005). Alternative modes of delivery suggest ways to accelerate remediation and/or improve outcomes for developmental education students, but institutions are advised to collect systematic data in order to measure the effectiveness of these innovations.
Remedial education has mainly focused on isolated skill development (Grubb, 1999), but Perin (2005) uncovered a variety of instructional practices. For example, one way to alter instructional format is to create learning communities, such as a cluster of courses for prenursing students that includes advanced developmental writing, introductory biology, and philosophy. Instructors for the courses would collaborate and align their curricula rather than teach without reference to the others. Ample reports of best practices for delivering remedial education exist within the literature (Boylan, Bliss, & Bonham, 1997; McCabe & Day, 1998; Roueche, Ely, & Roueche, 2001), but few practices have been methodically evaluated. While most educators would agree that utilizing a variety of teaching strategies and course formats is useful, it is recommended that some type of systematic, controlled evaluation should inform institutional decision making (Perin, 2005).

A growing trend is for postsecondary institutions at all levels to offer learning assistance centers designed to provide individual student support in both developmental and college-level courses. Learning assistance services typically include academic tutoring, computer-assisted learning, assessment, advising, and even counseling (Stern, 2001). The main function of learning assistance centers is compatible with that of remedial education – to help students develop efficient learning processes and improve college-readiness (Boylan, 2002; Casazza, 1999). In fact, colleges sometimes house their remedial education courses in the learning center. The difference is that the services of a learning assistance center are free and available to all enrolled students, not merely those identified as having difficulty with reading, writing, or mathematics. In addition, tutoring in centers is learned implicitly through practice with regular college-level assignments,
whereas remedial classes provide explicit instruction designed to strengthen specific literacy or math skills. Little research examines the effectiveness of these learning assistance centers, despite their pervasiveness in higher education (Perin, 2004), yet they are clearly intertwined with both the purpose and support for remedial education.

**Costs of Remedial Education**

The expense of remedial and developmental education is concerning but also difficult to define. Estimates range from one to nearly three billion dollars (Breneman & Haarlow, 1998; Strong American Schools, 2008) to support remedial programming nationally. Scholars have been unable to clearly identify costs associated with remedial and developmental education primarily because most data is reported institutionally, not via states. Even when researchers are able to consolidate institutional data into a usable format, it is largely unreliable because of variation among metrics for these programs. Some states report funding allocated for remedial instruction but not actual expenditures, while other states incorporate the “true” costs of developmental services, including overhead expenses. For example, Strong American Schools (2008) used higher education expenditures reported in the Integrated Postsecondary Education Data Survey (IPEDS) to determine cost per student for remedial education. Estimates showed that two-year colleges spent between $1,600 and $2,000 and four-year institutions spent between $2,000 and $2,500 on remedial education for each student. The Alliance for Excellent Education (2006), however, examined the cost of remediation through the lens of savings rather than expenses. By combining direct and indirect costs for remedial instruction, the analysis claimed that the U.S. would save more than $1.4 billion per year if fewer students were enrolled in remedial education courses. In fact, The Alliance for
Excellent Education (2006) estimated that the nation would increase revenues by approximately $2.3 billion annually from wages of college graduates who would otherwise be delayed by taking remedial courses.

Merisotis and Phipps (2000) argued that even though the costs for remedial and developmental education may indeed amount to more than two billion dollars, the price is modest compared to not educating these students at all or allowing them to drop out. For example, Bettinger and Long (2006) point out that unskilled individuals require additional social costs, such as unemployment costs, government dependency, crime, and incarceration. As the economy continues to demand a more educated workforce, the nation must seek effective ways to train workers. Hence, Merisotis and Phipps (2000) suggest policymakers examine the financial gains obtained when students successfully complete remedial programs and continue their education. Few studies, however, scrutinize remedial education through this cost effectiveness approach, leaving policymakers with little support.

Other critics argue that remedial and developmental education does not belong in postsecondary institutions, no matter the expense. The Alliance for Excellent Education (2006) argued students are paying double for learning content they should have obtained in high school. Not only are states losing financially by re-educating these students, but they are also losing future graduates as students needing remediation are more likely to leave college without a degree. Similarly, Strong American Schools (2008) reported that 37 percent of polled remediated students felt frustration after discovering they were unprepared for college-level work, causing concerns for student self-efficacy. Both evident and hidden costs for remediation remain troublesome for policymakers and
educators alike. Much more research should examine the cost effectiveness of remedial education in order to understand how students are impacted in terms of cost and degree completion.

Regardless of the inconclusive data, policymakers have pushed for remedial coursework to be taught in two-year colleges rather than four-year institutions as a way to address the perceived high cost of remediation. For example, The College Board (2008) reported that educational costs were approximately $8,500 for full-time study at public two-year colleges versus more than $10,000 at public four-year universities. That said, addressing the issue through perceived lower costs may not be the most effective strategy for students as other hidden costs appear to surface. For example, Melguizo, Hagedorn and Cypers (2008) determined students who take remedial and developmental education courses at the community college and then transfer to a four-year university ultimately paid more than non-remedial students in terms of tuition and time to degree. Unfortunately, most remedial students must take these courses without credit, requiring them to spend more time and money taking non-transferable credits. Students needing remediation in California paid nearly 44 percent more tuition than students who directly matriculated in college-level courses (Melguizo, Hagedorn & Cypers, 2008). Recent studies by the Education Trust (2010) and the Delta Project (Wellman et al., 2009) support these findings by showing that while community colleges require lower tuition, they ultimately cost students and taxpayers more than public four-year institutions due to low degree completion rates. Callahan and Chumney (2009), after studying remedial writing courses in both two-year and four-year institutions, argued that access to greater financial and instructional resources allows four-year colleges to be more effective in
teaching this population. Because community colleges are already overburdened, many scholars contend that four-year institutions should share the burden of educating the underprepared and not be taken off the hook for providing academic support to students (Brubacher & Rudy, 1976; McGrath & Spear, 1991; Education Trust, 2010).

Two of the largest and most well-known public university systems in the U.S. – City University of New York (CUNY) and California State University (CSU) transferred the responsibility for remedial coursework to two-year institutions within the state in the 1990s. Debates ensued regarding the tension between access and excellence in higher education. Even though proponents for the relocation of remedial education claimed CUNY’s four-year colleges would be better positioned to compete for top-performing students and offer stronger academic programs without being burdened by educating deficient students (Richardson, 2005), the policy essentially ended open admissions in CUNY’s four-year colleges. Lavin and Hyllegard (1996) argued that the former admissions policies of the University provided access to social mobility for a multitude of students, particularly those from low socioeconomic status or minority groups, who otherwise would have been excluded from a middle-class opportunity. Hence, while moving remedial education to two-year institutions may appear more cost effective to some policymakers, societal implications for mobility and equity cannot be overlooked.

Extending this argument, Bastedo and Gumport (2003) contend that relocation of remediation to two-year institutions actually creates mission differentiation in which decreasing educational redundancies and enhancing prestige for certain higher education sectors merely increases academic stratification and concerns about access, particularly for low-income students and students of color. Similarly, Dowd (2007) argued that
community colleges in these tiered systems are gatekeepers for aspiring students by maintaining transfer barriers and diverting students from earning bachelor’s degrees. For example, Parker and Richardson (2005) found that higher proportions of white students were enrolled in first-year cohorts of CUNY four-year colleges after the remediation move. In addition, a number of students placed into remedial coursework, and thus out of four-year institutions, opted instead to enroll in private colleges, register at out-of-state institutions, or forego postsecondary education altogether. The debate over who should deliver remedial education in postsecondary settings has become so heated that complete outsourcing to private companies is now being considered (Soliday, 2002).

Unlike CUNY, California State University (CSU) allowed students to take required remedial coursework at four-year institutions, but those who did not complete it within the first year of college were automatically disenrolled. Over a 10-year period beginning in the late 1990s, CSU disenrolled approximately 11 percent of its first-year students (Goen-Salter, 2008). Consequently, CSU and state education officials developed the Early Assessment Program (EAP) for students in California. High school students taking the test can receive scores and feedback regarding English and mathematics aptitude. As a result, increased support can be provided to those who demonstrate basic skill deficiencies required in college. This type of intervention not only bridges the gap between K-12 and higher education sectors, but it also supports targeted remedial instruction prior to college matriculation. Early studies at the Sacramento campus of CSU show a reduction in remediation in English by 6.1 percent and math by 4.1 percent (Howell, Kurlaender & Grodsky, 2009). Still, some scholars claim EAP continues to sort students who may not have resources at their high schools to
prepare them for college-level work, even after receiving notification of the need from the CSU system (Tierney & Garcia, 2008). Policymakers must be aware of how removing remedial education from four-year institutions may be more efficient and cost effective but can lead to differentiated access to higher education.

**Effectiveness of Remedial Education**

The overall effectiveness of remedial education is a pressing concern to lawmakers and higher education administrators alike as pressures to increase college attainment intensify. The real policy question, though, is whether low graduation rates are due to inadequate high school preparation or the remediation itself. Most studies examining the impact of remedial education merely compare students in remediation to those not taking the courses. For example, Adelman (2006) determined that 49 percent of students who took at least one remedial course graduated within eight years compared to nearly 70 percent of students who did not take any remedial courses. Two large-scale NCES studies conducted in 1996 and 2003 determined that freshmen enrolled in remedial classes were less likely to persist into their second year of college and were less likely to graduate on time than those who did not take the courses. However, as Bettinger and Long (2006) point out, these studies failed to control for characteristics related to academic ability. Lower-ability, less-prepared students are more likely to be placed in remediation, and with or without remediation, are less likely to persist and complete a degree.

Furthermore, merely examining correlation does not signify causality. Selection bias, or the fact that students who are placed in remediation differ from those who are not, make direct comparisons between students in and out of remediation invalid.
Bettinger and Long (2006) explain that gaps in student preparation identified through conventional measures such as test scores, GPAs or high school coursework must somehow be separated from the effects of remedial classes in order to truly assess the impact of remediation on student outcomes. In addition, a student’s choice of college may reflect preferences about remediation. For example, a student wishing to avoid remediation might choose a college with a very low placement cutoff. Researching the effectiveness of remediation requires overcoming these selection biases.

Unfortunately, few studies have developed methodologies that adequately control for student academic background. Two reviews of the literature on remedial and developmental education determined most studies were “methodologically weak” with almost two-thirds shown to have “serious methodological flaws” (O’Hear & MacDonald, 1995; Boylan & Saxon, 1999). Despite offering many insights related to the causal effect of remediation, the literature did draw attention to several factors that might support success for remediation programs, including clearly specified goals and objectives, a high degree of structure, a provision for counseling and tutoring, and a differentiation of methods for instruction (O’Hear & MacDonald, 1995).

Bettinger and Long (2005, 2009) attempted to demonstrate empirical evidence to this effect with two recent longitudinal studies. In 2005, the researchers showed that community college freshmen in Ohio earned fewer credits and were less likely to transfer to a four-year college or earn a degree. However, after controlling for academic background, researchers found remedial students completed degrees or transferred to four-year colleges at the same or better rate than students who did not take remedial courses. In 2009, Bettinger and Long extended these findings with a similar study of
Ohio remedial students. The researchers determined that even marginally remedial students experienced a positive effect on persistence and degree completion after controlling for academic preparation.

Similarly, Attewell et al. (2006) explored the impact of remedial course-taking on graduation rates, time-to-degree, and other outcomes. Using a series of regression analyses and propensity models while controlling for academic and family background, researchers found that remedial course enrollment did not reduce a community college student’s likelihood of earning an associate or higher degree. Instead, low socioeconomic status, poor academic preparation in high school, and being African American were predictors of low graduation rates. In fact, examination of four-year college students showed that more than 50 percent of remedial course-takers completed their bachelor’s degree within eight years of entering college, demonstrating little difference than non-remediated students.

Typically, remedial and developmental education programs are evaluated based on degree completion of students; however, scholars argue that assessing these programs based on graduation rates is too simplistic. Community college supporters contend that utilizing standard retention and graduation rates to measure institutional performance inaccurately paints a picture of educational inadequacy and even failure, when in fact students attend two-year institutions for reasons beyond degree completion or transferring to a four-year institution (Bailey, Leinbach, & Jenkins, 2006). At first glance, community college graduation rates seem very low with only 36 percent of students earning a certificate or associate degree within six years of initial enrollment (National Center for Education Statistics, 2003). In addition, significant gaps in degree completion
exist among Whites, Blacks, and Hispanics, as well as between low- and high-income community college students. Furthermore, a lack of research on community colleges (Townsend, Donaldson, & Wilson, 2005) is particularly detrimental when it comes to studying retention. Much of the research and understanding of retention is based on student engagement and integration with the college, concepts likely to be most powerful for residential students at traditional four-year institutions (Bailey & Alfonso, 2005).

Community college advocates refute claims that low student outcomes and disparities are due to policies, programs, or practices, but instead results are related to factors beyond the control of many institutions. Community colleges are expected to open their doors to all students, regardless of academic or socioeconomic challenges, often with fewer financial resources per student than public four-year institutions. Perhaps even more important, student goals and educational expectations vary widely at two-year institutions, causing retention and graduation rates to appear lower than other higher education levels through no fault of the institution itself (Bailey, Leinbach, & Jenkins, 2006). Instead, policymakers and researchers are urged to use a variety of measures, including those that take goals into account and adjust for student body characteristics, such as family income, race/ethnicity, and age (Bailey et al., 2006; Bailey, Crosta & Jenkins, 2006).

Nevertheless, critics of remediation claim that too many students are taking too many remedial and developmental education courses (Attewell, et al., 2006). Perhaps the more important question is how taking multiple remedial courses affects students. For example, Attewell et al. found that 14 percent of community college students and 5 percent of non-selective four-year college students take more than three remedial courses.
However, after controlling for academic preparation in high school, Attewell et al. determined that low graduation rates for these students were a consequence of poor academic backgrounds rather than the remediation itself. Students who took multiple remedial courses in four-year colleges were less likely to graduate, but approximately 33 percent of the few students who took remedial courses in four-year colleges still graduated within eight years.

Another angle of remediation to explore is the extent to which remediation helped students to complete subsequent college-level courses. Bailey, Jeong, and Cho (2009) discovered that students in community colleges who are placed in remedial education often fail to complete the remedial coursework. Students either never enroll in the assigned courses or they skip courses in the prescribed sequence. Hence, while many students in community colleges are referred to remedial education, the study found that less than one-third actually enrolled in the appropriate courses. Similarly, many students who completed the developmental courses never actually enrolled in the subsequent college level classes, despite the greater likelihood of success after completing the gateway courses.

A comparable study of the Virginia Community College System (VCCS) revealed that half of students enrolled in at least one developmental course, yet over one third of those recommended to developmental education in a given subject did not take any developmental courses at all (Jenkins, Jaggars, & Roksa, 2009). Most students did not complete the recommended developmental sequence because they did not enroll in recommended courses or because they did not pass the developmental courses that they took. Furthermore, movement into the subsequent gatekeeper college-level courses
within four years was low, especially in math. In fact, students who did take developmental courses did about as well in gatekeeper courses as those who did not, suggesting that developmental instruction did not make a difference but merely delayed educational attainment. Additional research should explore the differences between educational outcomes for students who take developmental coursework and those who forego developmental instruction but still maintain successful educational outcomes.

Along with sequencing of developmental coursework, concurrent enrollment in remedial and college-level courses presents difficulty for some students. Many institutions allow students to simultaneously take remedial classes alongside college-level courses not related to the area of developmental need (National Center for Education Statistics, 1996; Shults, 2000). A study by Illich et al. (2004) determined that students who are concurrently enrolled in remedial courses and college-level courses underperform in their college-level courses relative to students who are only enrolled in college-level courses. In fact, students who did not complete their remedial courses underperformed in their college-level courses, even after accounting for baseline differences on standardized placement tests. For these students, underpreparedness may not be limited to deficiencies in academic skills. Other factors, such as study skills, academic motivation, and financial resources may play a critical role.

One potential extrapolation of these results is that utilizing a single measure of academic aptitude, such as a placement test, is not adequate for predicting outcomes of students. Grimes and David (2000) found that college-ready students and underprepared students differ along a range of experiential and attitudinal measures. Motivation, self-efficacy, and other psychological factors could be important determinants in academic
achievement. Designing developmental programs, rather than just remedial classes in particular subject areas, that address both academic and psychological needs could provide a more comprehensive approach to helping underachieving students.

Even though policymakers continue to maintain that remedial and developmental education reduces success for students, empirical evidence related to effectiveness of remedial and developmental education is not that clear. Academic preparedness and coursetaking behavior appear to affect student success more than the remediation itself. Regardless of the criticism, more research should be conducted on the effectiveness of remedial and developmental education before policymakers jump to conclusions.

**Increased Accountability.** If college attainment rates are to improve, states and postsecondary systems need to follow and support students throughout their entire higher education career. The Education Commission of the States (Smith, 2011) recommends tracking indicators of remediation success along a continuum: initial (passing developmental courses); intermediate (persisting to a second year and passing college-level courses); and final (obtaining a certificate/degree and transferring to a four-year institution). As more and more states establish student tracking systems, these measures of accountability become easier to examine, yet some administrators are becoming leery of how the data are used.

In an effort to better evaluate the effectiveness of state policies and programs on students, officials are implementing statewide data systems that track individuals from preschool through higher education. National programs, such as Complete College America (CCA), Developmental Education Initiative (DEI), and the Complete to Compete Project (NGA) have championed greater use of data for accountability
purposes, namely for performance funding and continuous improvement strategies in remedial education. Utilizing sophisticated research techniques that assess causality, statisticians can more easily quantify which education programs are deemed most effective. By periodically evaluating programs, policies and institutional performance, states can leverage existing resources to produce more positive outcomes more efficiently (Smith, 2011). In addition, focusing on continuous improvement ensures that states and systems consider how to evaluate process, not just outcomes, by examining programs and strategies that impact performance directly.

A remedial education policy analysis by Smith (2011) found that a majority of states collect and track data on students taking developmental education courses, but few states have a formal accountability policy to connect data to the evaluation of programs and strategies. Most states track student participation in remedial education, but rarely do these states track success in college-level courses or persistence rates after the first year of college. Although the quality and comprehensiveness of student data systems vary significantly, most states are improving communication across educational sectors and developing strategies to mine data in order to test the impact of particular polices and program innovations.

Some states have linked postsecondary and K-12 data systems to conduct research on the impact of high school course-taking patterns on college success and to measure progress. Texas, Colorado, and Florida have implemented such state-level data systems. The Florida Department of Education recently used this data to measure the impact of Student Life Skills courses as an orientation to the first year of college. Researchers found that students who completed the classes were more likely than noncompleters to
earn a credential, transfer to a four-year state university system, or remain continuously enrolled after five years (Florida Department of Education, 2006). A recent Colorado analysis by Lefly, Lovell, and O’Brien (2011) showed that students needing remediation in their first year of college could have been identified by an examination of their state assessment results as early as sixth grade. Utilizing cross-sector data to such ends will help educators and legislators better understand which policies and programs are helping to improve college attainment rates.

**Continuous Improvement.** In an effort to support states attempting to develop comprehensive remedial education policies, Getting Past Go (GPG), was established as a national initiative to leverage developmental education at postsecondary institutions as a critical component of state efforts to increase college attainment rates. As an arm of the Education Commission of the States and in collaboration with the Project on Education Policy, Access and Remedial Education (PREPARE), GPG has established a policy database for all fifty states and the District of Columbia. Primarily, the policies demonstrate how states and postsecondary systems hold institutions accountable for student success and promote continuous improvement strategies to evaluate and reform remedial programs (Smith, 2011). As a result, GPG developed a policy framework from which states could scrutinize their policies for performance reporting, performance benchmarking, performance funding, and continuous improvement and strategic planning.
Performance reporting is defined as any effort by states, postsecondary systems or institutions to publish data on remedial program participation, student success, program cost or student persistence to college-level work. Reported data varies substantially by state, but 33 states published data on remedial and developmental education (Smith, 2011). Fewer states incorporated these data into funding and accountability efforts.

Performance benchmarking involves creating indicators to measure and manage performance outcomes. Again, states vary widely in which performance indicators for remedial education are used. Recent policy trends show progress benchmarks that increase the odds of student completion. For example, Washington and West Virginia explicitly refer to their remedial performance benchmarks as part of a broader continuum (Smith, 2011). Recently, Complete College America and the National Governors Association published progress and outcome metrics that states may use to measure student success and program productivity. The most prevalent measures include remedial
course completion, completion of gateway college-level courses, second year persistence, and degree completion.

Performance funding systems distribute resources to postsecondary institutions based on how effectively they serve remedial education students. Only a handful of states use performance funding, and those that do vary widely on which mechanisms are used to evaluate performance and how much performance funding is distributed as a percent of the total state allocation. Trends do show that more legislatures and postsecondary systems are considering performance funding models as a means of incentivizing improvements in student program outcomes. For example, California, Louisiana, and South Carolina have remedial education policies for evaluating program effectiveness but no mechanism to reward institutions for improved performance. Other states, such as Colorado, Indiana, Tennessee, Ohio, and Washington, are considering initiatives that promote performance funding for higher education, and specifically remedial education (Smith, 2011). Getting Past Go recommends performance funding that rewards institutions not only for degree completion, but also for progress metrics, such as remedial education success.

Continuous improvement policies are targeted toward regular and consistent evaluation of program effectiveness, the cost and productivity of remedial education, or the impact of policy on outcomes. By providing for periodic review of remedial education policies and programs, continuous improvement strengthens accountability and ensures efficient and steady progress on the intended outcomes of the policy (Smith, 2011). For example, Ohio and Tennessee use performance funding as a continuous
improvement instrument. They encourage campuses to regularly examine their programs closely to improve their benchmark targets, which will in turn trigger performance funds.

Ultimately, policymakers argue that stronger accountability and continuous improvement efforts will help states utilize existing resources efficiently while aligning strategies with goals and measures toward the main goal of improving college readiness and increasing degree completion rates. The growing attention paid to improving remedial education shows the public’s commitment to ensuring better educational outcomes and improving state economies (Smith, 2011).

Placement in Remedial Education

Most students are placed into remedial and developmental education as a result of taking placement tests in reading, writing and/or mathematics. Nationally, the most widely used placement exams are ACT’s Computerized Adaptive Placement Assessment and Support Systems (COMPASS) and the Assessment of Skills for Successful Entry and Transfer (ASSET), as well as ETS’s Accuplacer (Bettinger & Long, 2006), but other popular placement tests include the Test of Adult Basic Education (TABE); the Adult Basic Learning Examination (ABLE); and the Comprehensive Adult Student Assessment Systems (CASAS) (Grubb, 1999). The tests measure student skills using a variety of evaluations. For example, the ASSET exam is a written test with as many as twelve subsections, including assessment of writing, numeric, and reading aptitude. Some institutions develop their own examinations, including essay tests and other writing assessments. Testing services generate great revenue from the implementation of these exams as well as study materials for students.
Typically, institutions use set cutoff scores on these standardized placement tests to determine who needs remedial coursework. Higher education institutions also rely on SAT/ACT scores, high school GPA, high school exit exam results, Advanced Placement (AP) scores, and transfer course grades from other colleges as means for assessing remediation needs. Institutions often create an index score that combines and weights any or all of these numbers to determine both admissions and remediation. Students achieving below these prescribed levels are assigned to remedial coursework to address academic deficiencies in particular subject areas, particularly reading, writing, and mathematics. Literature points to high variability in how postsecondary institutions identify proficiency prior to matriculation (Horn et al., 2009; Levin & Calcagno, 2008; Perin, 2006). In addition, correlations between standardized assessment results and future college success are weak (Bailey, 2008).

Some researchers argue that high stakes tests should not be used for placement into remedial and developmental education because cutoff scores vary by state, higher education system, and institution (Bettinger & Long, 2005). For example, a student may be eligible to enroll directly in college-level courses at one institution but be required to take remedial coursework at another institution. Bettinger and Long found as much as three points of a disparity among ACT scores and 170 points for SAT scores being used to determine remediation in Ohio institutions. Variations of as much as eighteen points for placement exam cutoff scores existed. College and university administrators may argue that discrepancies in institutional academic rigor require dissimilar placement policies, but others view these variations as politically charged sorting mechanisms for higher education. For example, Soliday (2002) noted that historical evidence of
decreasing enrollments at CUNY was directly related to the initiation of requirements for completing basic writing coursework in order to continue postsecondary study. As previously noted, variation in cutoff scores among institutions allows many four-year colleges and universities to bypass supporting underprepared students, many of whom represent already underrepresented populations of college students.

To confound the problem, many postsecondary institutions either do not mandate assessment at all, or they do not mandate actually taking remedial coursework after placement exams deem it necessary (Bailey, 2009; Levin & Calcagon, 2008; Perin, 2006). Institutions with limited resources may not be able to afford the testing mechanism or to accommodate the number of students needing remedial education. As a result, both states and colleges soften their own placement mandates by permitting the override of test scores, lowering cutoff scores, and substituting college-level classes for remedial courses. At one college, Perin (2004) found that low-skilled students were exempt from remedial courses if they signed a waiver. At another institution, only one area of remediation was required, regardless if the student placed low in all three areas of reading, writing, and math. In addition, institutions often rely on open admissions and placement policies as a means for maintaining enrollment. For example, one college mandated developmental education but permitted low-scoring students to take selected college-level courses instead of skills classes because it did not have enough developmental sections, and the students were eager to begin their degrees (Perin, 2004). Applying too much academic pressure on students may end in increased dropouts, which could impact an institution’s bottom line (Perin, 2006).
State policymakers are trying to strike a delicate balance among assessment and placement policies. On one hand, policies which are too permissive allow students to enroll in college-level courses without adequate preparation or support, setting up both the student and the institution for failure. On the other hand, overly restrictive policies may require remediation for students on the cusp of succeeding without intervention, such as those who fall just below the established cut score for placement into remediation. While advocates for standardization suggest setting clear expectations for how to move to the next educational level would improve college readiness and attainment, others claim that too much standardization could be a problem if the state adopts low placement cutoff scores in order to allow students to be eligible at even the weakest academically performing institutions. Institutional leaders also fear that mandatory placement and standardized cutoff scores might be too rigid and would only lead colleges to seek exemptions, waivers, or other exceptions that undermine the policy’s intended impact. Opponents also point out the cost and capacity challenges posed by mandatory tests and placement scores. Some states have tried to combine uniformity with flexibility. Texas and Minnesota, for example, have set a statewide minimum for requiring placement into remedial education, but they allow individual postsecondary institutions to set scores above the floor. Texas also makes it possible for students to delay taking the placement test and to re-test in their second semester (Prince, 2005). It is easy to see how arguments can be made for both standardization and flexibility with regard to placement policies.

One possible solution to the differentiation among institutional placement into remediation is to develop statewide standardized policies for remedial and developmental
education. Ewell, Boeke, and Zis (2008) with the National Center for Higher Education Management Systems (NCHEMS) recently explored pre-college to college transition policies in all fifty states. Fourteen states currently maintain a statewide policy governing placement as well as a common set of placement tests that must be used. In the remaining states, placement tests are determined on the institutional level. To further standardize remediation, eleven states have established mandated cut scores for all public higher education institutions. Four additional states are currently developing statewide mandatory remediation policies. In many of these states, institutions can choose higher cutoff scores if they notify state authorities, but they are not permitted to go lower than the state minimum standards for remediation.

Currently, 33 states have no common college placement policy in place, but several report that placement practices are becoming more aligned despite not implementing a formal policy. In Connecticut and Minnesota, for example, community and state colleges have voluntarily adopted placement standards regardless of a state mandate. Other states, however, have no intention of standardizing placement practices. New York and California state officials view common placement policies to be counterproductive because the public colleges and universities are so numerous and diverse, whereas other states like Michigan or Pennsylvania lack a state coordinating agency or its authority to make such a move.

The wide variety of placement policies among states along with recent political attention by President Obama begs the question of whether statewide standardization should be pursued. Instead of allowing institutional variability in higher education, should states mandate remediation, require placement testing, and establish standardized
cutoff scores for students entering colleges and universities? Eleven states have
implemented statewide mandatory remediation policies to date with states like
Connecticut, North Carolina, and Virginia currently in the process.

Because the momentum for standardizing and mandating remediation statewide is
growing rapidly, additional research should be conducted to determine the effectiveness
of such initiatives. Empirical evidence to either support or refute these policies should
support states planning to invest additional time and money implementing such
initiatives. To that end, this study seeks to investigate: *What is the impact of statewide
mandatory remediation policies on college student retention and degree completion for
two-year and four-year postsecondary institutions nationally?*

**Colorado: A Case Study**

Colorado exemplifies a state grappling with how to improve access to higher
education while also maintaining academic rigor. With 28 public institutions of higher
education, including 15 two-year public institutions and 13 four-year colleges and
universities, nearly 30 percent of all incoming freshmen into higher education required
some level of remediation in at least one discipline during the 2009-2010 academic year.
Remediation was required for 52 percent of two-year college students and 18 percent of
four-year public institution enrollees, compared to the national average of 44 percent for
two-year colleges and 30 percent of four-year institutions (CCHE, 2011). Even though
these percentages may seem staggering, the state showed a noticeable decrease in
remediation rates for the first time in recent years. Since 2005, a downward trend in
remediation has been observed in community colleges, from a high of 55.9 percent to
52.7 percent in 2010. Similarly, four-year institutions report an overall decrease from a
high of 21 percent in 2008 to 18.3 percent in 2010 (CCHE, 2011). Declining remediation rates could be the result of recent policy innovations implemented at the state level, but a direct correlation has not been researched to date.

Most Colorado students required remediation in mathematics, followed by writing and then reading. According to CCHE (2011), approximately 41 percent of two-year students and 14.5 percent of four-year students were assessed as needing math remediation. Also of concern is that 17.2 percent of students entering two-year institutions were assigned to remediation in all three subjects of math, reading, and writing. Approximately 2.6 percent of students at four-year institutions reported needing remediation in all three subjects. Colorado nontraditional students, defined as those 20 years and older entering college, comprised a smaller proportion (40.5%) of the undergraduate population but a higher percent of those students requiring remediation in at least one course (35.0%).

The cost of remedial education increased from $13 million in FY2009 to approximately $19 million in FY2010. This figure does not include an additional $6.7 million in tuition paid by students or remedial coursework taken in cash-funded classes or coursework during the summer. As higher education funding in Colorado continues to be cut, these numbers appear even more worrisome. However, CCHE (2011) contends that the cost of not providing the opportunity for underprepared students to enroll in college, persist to graduation, and enter the workforce must be considered. Despite the controversy regarding remediation in the state (particularly whether the responsibility lies with community colleges or four-year institutions), CCHE argues that remedial education is relevant and important to the overall goals of the state, as it aligns with providing
access and opportunity to citizens, aids in preparing a strong workforce, and helps to maintain economic competitiveness.

Over the last decade, Colorado has initiated several policies directed at improving college success and continues to develop strategic plans that incorporate many of the progressive measures discussed in the literature. In August 2000, the Colorado Commission on Higher Education adopted a remedial policy (C.R.S. 23-1-113.3) designed to ensure that:

- All enrolled first-time undergraduate students are prepared to succeed in college-level courses;
- Students assessed as needing remedial instruction obtain accurate information regarding course availability and options to meet the college entry-level competencies; and
- Colorado public high schools are informed about the level of college readiness of their recent high school graduates.

(http://highered.colorado.gov/Publications/Policies/Archive/i-parte11-03.pdf)

The policy applied to all state-supported institutions of higher education, primarily public two-year and four-year colleges and universities. In March 2001, CCHE clarified exactly which public institutions may claim state support for remedial education, which included only Colorado community colleges, Adams State College, and Mesa State College, and the circumstances under which support may be received. CCHE also added separate reporting requirements to enable monitoring of state costs associated with the delivery of basic skills courses.
In 2003, CCHE revised its remedial policy again, effective for fiscal year 2005, by 1) clarifying a minimum passing score for placement in college-level mathematics; 2) determining concordances for scores between different types of assessment tests; 3) specifying the undergraduate population to be assessed, and if necessary remediated; and 4) clarifying when institutions are required to enforce mandatory remediation. Assessed students not meeting specific minimum cut scores were directed to be placed in college-level courses provided that a student’s transcript or secondary level assessment justified such placement. Institutions were also required to implement mandatory advising of students within 30 hours of course work if the student still had unmet basic skills deficiencies. Colorado’s three acceptable assessment instruments for determining if a first-time student is college ready in mathematics, writing, and reading, along with relevant cut scores, are outlined in Table 1.

Table 1.  
*Colorado Assessment Instruments and Relevant Cut Scores Used to Determine Mandatory Remediation in Mathematics, Writing, and Reading*

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>ACT Subscore</th>
<th>SAT Subscore</th>
<th>ACCUPLACER Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>English: 18</td>
<td>Verbal: 440</td>
<td>Sentence Skills: 95</td>
</tr>
<tr>
<td>Reading</td>
<td>Reading: 17</td>
<td>Verbal: 430</td>
<td>Reading Comprehension: 80</td>
</tr>
</tbody>
</table>

Colorado also added a provision to its remediation policy that placed the burden for remedial education on two-year community colleges. Colorado’s policy stated that only postsecondary institutions with a two-year role and mission may offer and receive state general fund support for basic skills courses. Four-year colleges may offer the courses by either contracting with a Colorado public community college or by charging the student on a cash-funded basis. Along with a national trend, remedial education in
Colorado became primarily the role of community colleges while four-year institutions were no longer provided general fund support for these initiatives.

In 2008, the Colorado legislature moved to require the alignment of the PreK-12 system and the higher education system into a combined P-20 system with the ultimate goal of postsecondary and workforce readiness for all Colorado students. The Colorado Achievement Plan for Kids (CAP4K) pushed for educational reform that focused on developing college- and workforce-ready high school graduates from the very earliest grades. The Colorado Department of Education (CDE) and the Colorado Department of Higher Education (CDHE) jointly developed and adopted a description of postsecondary and workforce readiness (PWR) that defined the essential knowledge, skills, and behaviors required for high school graduation, college entry, and workplace success. Stakeholders from PreK-12, postsecondary education, business, and the military united to develop new academic standards as well as a new assessment system to measure them.

In 2010, the Colorado State Board of Education also adopted the Common Core State Standards recommended by the Council of Chief State School Officers and the National Governor’s Association. As a result of these initiatives, Colorado is currently launching a new assessment program (TCAP) that will include more formative (interim) assessments throughout the year rather than merely relying on summative (single, end-of-year) evaluations.

As a part of CAP4K, Colorado’s PreK-12 and higher education systems were encouraged to collaborate on sharing data. Consequently, CCHE revised the remedial policy yet again to direct postsecondary institutions to use the same State Assigned Student Identifier (SASID) system as used in the PreK-12 system no later than July 1,
2009 (C.R.S. 23-5-127). Previously, matching postsecondary students with their PreK-12 educational histories was not possible. The policy stipulated that once all Colorado community colleges, including Mesa State College and Adams State College, begin using the unique student identifiers as required in section 23-5-127 (4), the institution and the Department shall report individual student information using a unique identifier. The intent for the SASID system is that both the Colorado Department of Higher Education (CDHE) and the Colorado Department of Education (CDE) can track students from high school into college and devise a plan to disseminate the information. As a result, the most recent remediation report published by the Colorado Commission on Higher Education attempted to present a broader scope of remediation in Colorado by providing information related to 1) remedial needs of non-traditional or adult learners in the state; 2) graduation rates of public college students needing remediation and those not requiring remediation; 3) educational attainment level and remediation needs of recent high school graduates by county in Colorado; and 4) longitudinal percentages of recently graduated high school students needing remediation by individual high schools (http://highered.colorado.gov/Publications/Reports/Remedial/FY2010/2010_Remedial_relfeb11.pdf). Reporting on remediation needs by county and high school suggests to the public which geographic areas and K-12 systems are adequately preparing students for college. The media in Colorado publish results from the reports, possibly creating a sense of competition among schools. For example, Denver Public Schools Superintendent Tom Boasberg responded to the most recent report by stating, “It speaks clearly to the need as a district to increase our expectations and the intensity of our curriculum” (Robles, 2011).
Initial research stemming from the increased reporting across education sectors has been illuminating. For example, Lefly, Lovell, and O’Brien (2011) recently published an examination of the predictive utility of the ACT for Colorado and the Colorado Student Assessment Program. The report compared Colorado state assessment data with identified college remediation needs for approximately 17,500 students who graduated from Colorado high schools in spring 2009. Findings showed that students needing remediation in their first year of college could have been identified through an examination of their state assessment scores as early as sixth grade. The report highlights the value of data mining throughout the continuum of kindergarten through postsecondary education as well as the importance of establishing clearly articulated P-20 alignment.

To that end, Colorado received a federally funded grant for $35 million from the U.S. Department of Education to support preparation of low-income students for college. With nearly a third of Colorado public school students qualifying for free or reduced lunch, the majority of whom come from families in which no one has ever attended college, Colorado GEAR UP seeks to close the Colorado Achievement Gap related to college admissions and graduation. The program, managed by the Colorado Department of Higher Education, focuses on early intervention and mentorship designed to raise the expectations of low-income and academically needy students and, thereby, increase college attendance and success. The program provides scholarship funding for qualified students and offers encouragement on their path to college access and success (http://www.coloradogearup.org).
Colorado also received a *Complete College America Completion Innovation Challenge Grant* of $1 million funded by the Bill and Melinda Gates Foundation for shifting to performance funding, reducing time-to-degree, transforming remediation, restructuring course delivery methods, and deploying transformative technology. Eighty percent of the grant funds are being sent to community colleges in Colorado with the purpose of hiring a statewide dean of developmental education, hiring faculty for tutoring, and for support services, equipment, and student communication. Remaining grant funds will go to the Colorado Department of Higher Education (http://highered.colorado.gov/dhedefault.html).

Colorado continues to demonstrate a commitment to improving college success by enacting legislation related to matriculation and postsecondary access. In May 2011, two bills were ratified by the Colorado Legislature which will promote progressive policies in remediation. First, Senate Bill 11-111 created an Education Success Task Force (ESTF) in the Executive Branch which will report to the Education Committees of the House and Senate as well as the State Board of Education and the Colorado Commission on Higher Education. The committee is comprised of six legislators, representatives from the education and business communities, and parents in an effort to provide greater collaboration between K-12 and higher education systems by investigating the education continuum and identifying the best ways to benchmark success from kindergarten through college. The charge of the ESTF is to review data and studies concerning student academic transition points, to recommend strategies and tools for identifying and remediating students at the significant transition points, and to work closely with the Governor’s Education Leadership Council. By identifying key academic
transition points where performance is critical, the ESTF hopes to ensure that students can demonstrate postsecondary and workforce readiness no later than high school graduation. In addition, the ESTF plans to utilize data and research on intervention education services and remedial education in order to identify best practices and strategies that might direct future policy initiatives. Up to eight bills may be recommended by the ESTF to the Legislative Council between 2012 and 2013. The ESTF is currently considering legislation to replace the 10th grade Colorado Student Assessment Program (CSAP) with Accuplacer diagnostic testing, extend the use of the Colorado Growth Model and individual career and academic plans (ICAPs) to higher education, reverse-transfer degrees, and make changes to the Gateway to College Dropout Recovery Program to address funding issues (http://highered.colorado.gov/dhedefault.html).

In addition to the Education Success Task Force, the Colorado Legislature also passed Senate Bill 11-52, which will make recommendations for a new master plan for the state system of higher education. Of primary importance to remedial education is the mandate that by December 1, 2013, the Colorado Commission on Higher Education must create, and subsequently recommend to the General Assembly, a performance-based funding plan by which each governing board will be appropriated funds, including junior colleges and vocational schools. A portion of the performance funding amount for the applicable state fiscal year will be based on demonstrated success of the institutions in meeting the goals and expectations outlined in their performance contracts. The funding plan must specifically address how it will affect state scholarship fund stipends (also known as the Colorado College Opportunity Fund) and fee-for-service contracts. The
legislation indicates that performance funding must be based solely on performance and not on an institution’s other funding sources. After the 2015-16 state fiscal year, the Colorado Legislature will then appropriate 25 percent of higher education funds based on the performance of the postsecondary institutions demonstrated by their ability to meet set goals and expectations (http://highered.colorado.gov/dhedefault.html).

Because Colorado implemented its statewide mandatory remediation policies within the last ten years and due to its demonstrated commitment to continue implementing progressive policies, the state provides an excellent example of how states are seeking to diminish remediation. In an effort to provide empirical evidence for other states considering such measures, this study will utilize data from the state of Colorado to explore: What is the impact of statewide mandatory remediation policies on college student retention and degree completion for two-year and four-year postsecondary institutions at the state and institutional levels?

Summary

Throughout the entire history of American higher education, remediation has offered college opportunity to those who may not have the necessary skills to be successful at the postsecondary level. Recently, increasing budgetary limitations have forced many states to grapple with how to address large numbers of students requiring remediation in higher education. Participation, placement, delivery, and expense are all areas of concern for postsecondary administrators and state policymakers. Colorado, in particular, offers a case study for how states are attempting to improve college student retention and degree completion using statewide initiatives.

If college student outcomes are to improve, particularly for minorities and economically disadvantaged populations, policies that smooth the transition between high
school and college must be investigated. That said, as statewide mandatory remediation policies gain momentum nationally, policymakers would be wise to explore the effects of such initiatives before implementing new measures. Using the existing sample of states which have implemented such policies, this study sought to evaluate the impact of statewide mandatory remediation policies on college student retention and degree completion for public two-year and four-year postsecondary institutions at the national, state, and institutional levels. Empirical evidence to either support or refute these policies would provide substantiation for whether or not to continue to invest additional time and money on such statewide initiatives.
CHAPTER III

METHOD

A quantitative research design was used to determine the impact of statewide mandatory remediation policies on college student retention and degree completion. Because students are selected for remedial education, a randomized control trial was not possible, necessitating a quasi-experimental research design. To this end, pre-policy and post-policy comparison groups were established to examine the effects of the policy for each state. Bamberger, Rugh, and Mabry (2006) claim that other than a comprehensive longitudinal design which assesses the policy during at least four different points in time, analyzing data at these two main points of policy implementation, using both policy and comparison groups, provides the strongest general-purpose evaluation design.

For the purposes of this study, the terms degree completion and graduation rates are used interchangeably. First-time, first year students (i.e., direct entry from high school) who successfully completed an undergraduate degree program, be it on the associate’s or bachelor’s degree level, were included in graduation rates for the respective institutional levels of either two-year or four-year colleges and universities. Retention rates measured the proportion of first-time, first year undergraduate students who completed the first year of study at an institution and re-enrolled during the fall of the second year at the same institution. When available, two-year community college retention rates also included transfer rates to other public four-year institutions as this measure still indicates retention within a degree-seeking program. For example, many
community college students complete two years of general study and then transfer to a four-year institution, often without officially “completing” an associate’s degree. Hence, students who transferred to four-year institutions without graduating from the community college were included in retention rates for the two-year college because the students are continuing undergraduate study.

**The National Context**

In order to provide empirical evidence for other states considering the implementation of statewide mandatory remediation policies, this study first examined the effects of such initiatives on state postsecondary graduation and persistence rates. National panel data was utilized to explore: *What is the impact of statewide mandatory remediation policies on state-level college student retention and degree completion for two-year and four-year postsecondary institutions?*

In 2008, the Center for State Policy on Student Progression (C2SP) at the National Center for Higher Education Management Systems (NCHEMS), funded by the Lumina Foundation for Education, conducted a fifty-state inventory of policies related to higher education transitions. State Higher Education Executive Officers (SHEEOs) for each state were sent an initial letter describing the project and the type of information requested. Through follow-up phone and email conversations, SHEEOs then designated a staff member who could help assemble necessary policy information for NCHEMS. Using open-ended email surveys, agency staff from each state briefly described existing or developing policy initiatives and pointed to websites or other locations for finding the student transition policies in question. NCHEMS staff then reviewed these primary source materials in order to gather data on each state’s policies regarding the transition
from secondary to postsecondary education. At the conclusion of the data collection process, researchers summarized results for each state and verified findings with each state’s designated official. In an effort to create a central national repository for state policies related to student progression and success factors, NCHEMS posted each state’s responses to policy questions as well as links to actual policies on its website (http://www.nchems.org/c2sp).

In order to analyze remediation policies, this study focused specifically on responses to the following NCHEMS set of questions:

Is there a statewide policy on placement into college-level courses or remedial courses? Is a standard set of placement tests recommended or required? If yes, are common cut scores for placement decisions in place or do institutions get to set their own?

Narrative answers to these questions were compiled and analyzed for each of the fifty states. Eleven states included all three measures in their remediation policies for every public college and university: a statewide placement policy, a standard set of placement tests, and common cut scores to determine placement. In addition, four states were in the process of developing policies which incorporated all three measures. Because effects of policies not yet established in these states could not be evaluated, these four states were eliminated from data analysis for this study.

For each of the eleven states which had already implemented all three provisions of statewide mandatory remediation policies, original primary source materials were sought to validate information from the NCHEMS database. Analysis of data demonstrated that statewide common cut scores were the least common, most restrictive,
and most recent provisions of all of the eleven states’ placement policies. As a result, dates of implementation were gathered for each state’s common cut score provision of the placement policy. Officials from each state were contacted via phone or email to verify policy implementation information. Table 1 summarizes remediation policies for each state based on responses to the NCHEMS survey, evaluation of policy provisions, and verification of information with state officials.

Table 2

<table>
<thead>
<tr>
<th>State</th>
<th>Year of Policy Impl.</th>
<th>Statewide Placement Policy</th>
<th>Statewide Common Test</th>
<th>Statewide Common Cut Score</th>
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<tr>
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Nevada  yes  no  no  
New Hampshire  no  no  no  
New Jersey  no  no  no  
New Mexico  developing  developing  developing  
New York  no  no  no  
North Carolina  no  no  no  
North Dakota  no  no  no  
Ohio  developing  developing  no  
Oklahoma  yes  no  no  
Oregon  no  no  no  
Pennsylvania  no  no  no  
Rhode Island  developing  developing  developing  
South Carolina  no  no  no  
South Dakota  2000  yes  yes  yes  
Tennessee  no  no  no  
Texas  2003  yes  yes  yes  
Utah  no  no  no  
Vermont  no  no  no  
Virginia  no  no  no  
Washington  no  no  no  
West Virginia  2002  yes  yes  yes  
Wisconsin  yes  no  no  
Wyoming  no  no  no  

**Dataset**

Exploring the effects of statewide mandatory remediation policies on student retention and degree completion requires examining data for each state. As the National Center for Higher Education Management Systems (NCHEMS) has identified, data following students from high school through their transition to college until degree completion are virtually nonexistent. Data that do exist through the National Center for Education Statistics (NCES) are not easily grouped by state. Hence, establishing clear conclusions about the effects of treatments during this transition period have been difficult to determine. In an effort to bridge this gap and better define which states are supporting college transition periods and degree completion, NCHEMS has aggregated
data from several national databases into a Student Pipeline dataset. Sponsored by a
grant from the Lumina Foundation, NCHEMS compiles and maintains data related to
student progression and educational attainment for all fifty states from 9th grade to
college completion using statistics for high school graduation, direct college entry, and
graduation within 150 percent of time required by the degree program (six years for a
bachelor’s degree and three years for an associate’s degree). Student Pipeline data
includes only first-time, direct entry public college and university students, not transfer or
nontraditional students.

For the purposes of this study, state graduation rates within 150 percent of time
required for the degree program (three years for community colleges and six years for
four-year institutions) were utilized for student cohorts beginning in 1991 to 2006.
Because several states implemented statewide mandatory remediation policies prior to or
after the graduation dates available for analysis, some of the eleven states determined to
have the most restrictive remediation policies were eliminated from data analysis. Only
seven states included both pre- and post-policy data for 3-year graduation rates:
Colorado, Louisiana, Massachusetts, Mississippi, South Dakota, Texas, and West
Virginia. Similarly, only five states included pre- and post-policy data for 6-year
graduation rates: Massachusetts, Mississippi, South Dakota, Texas, and West Virginia.

Since NCHEMS data only reports state retention statistics for recent years, data
compiled from Measuring Up: The National Report Card on Higher Education was
utilized to analyze college student retention data from each state between 2000 and 2008.
Historical data before 2000 and more recent data since 2008 is not available through
NCHEMS or Measuring Up. Furthermore, IPEDS reports data based on certain cohorts
of students at particular colleges, but it does not easily identify statewide longitudinal data for analysis. As a result, the impact of statewide mandatory remediation policies on college student retention can only be analyzed using pre- and post-policy panel data from four states which implemented policies between 2002 and 2006: Colorado, Louisiana, Texas, and West Virginia.

**Model for Analysis**

A fixed effects model was used to analyze panel data from each state. In a fixed effects model, characteristics of each state remain constant while comparing effects of the policy within each state rather than among heterogeneous states. Using state fixed effects on panel data controls for heterogeneity by accounting for time-invariant characteristics between the states, but it does not account for factors that change over time, such as the state’s unemployment rate. Fixed effects models minimize threats to validity and estimate causality with more strength than a simple OLS regression (Kennedy, 2008).

Because fixed effects models do not account for factors that change over time, variables were included to account for known time-variant characteristics which might affect the regression. As Bettinger and Long (2009) determined, controlling for academic background and socioeconomic status of students altered the apparent effects of remediation. In an effort to account for such characteristics on a state rather than individual level, variables for state rates of high school graduation, rates of high school to college entry, and higher education spending per pupil were added to the regression to similarly control for a state’s academic and financial background. Data for these additional variables were collected from NCHEMS.

The final model utilized for analysis was:
\[ y_{it} = \beta_0 + \beta_1 (\text{policy})_{it} + \beta_2 (\text{hsgrad})_{it} + \beta_3 (\text{hscollege})_{it} + \beta_4 (\text{hspend})_{it} + \alpha_i + \epsilon_{it}, \]

where:

\[ y_{it} = \text{dependent variable of either the graduation rate or retention rate observed for each individual state } i \text{ at time } t \]

\[ \beta_0 = \text{intercept} \]

\[ \beta_1 \ldots \beta_4 = \text{effects of the respective variables} \]

\[ \text{policy}_{it} = \text{time-variant regressor of policy implementation} \]

\[ \text{hsgrad}_{it} = \text{time-variant regressor of state high school graduation rate} \]

\[ \text{hscollege}_{it} = \text{time-variant regressor of state high school to college entrance rate} \]

\[ \text{hspend}_{it} = \text{time-variant regressor of state higher education spending per FTE pupil} \]

\[ \alpha_i = \text{unobserved individual state effect} \]

\[ \epsilon_{it} = \text{error term} \]

All data were analyzed based on the year of policy implementation. Because statewide remediation policies impact incoming freshmen, graduation rates were included for the years in which a cohort would have graduated after 150% of time. For example, a 1997 policy implementation for a state required examination of the 1991 entering cohort for a four-year institution who would have graduated within 150% of time after six years. One may also view this as \( t+6 \) for four-year institutions and \( t+3 \) for two-year institutions. Similarly, retention rates were evaluated based on the year in which a cohort entered and was retained one year later, in other words \( t+1 \) (see Table 3).
Table 3
Years of State-Level Policy Analysis

<table>
<thead>
<tr>
<th>Policy Implementation Year ((t))</th>
<th>Retention Year ((t+1))</th>
<th>3-year Cohort Graduation Year ((t+3))</th>
<th>6-year Cohort Graduation Year ((t+6))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1997</td>
<td>1999</td>
<td>2002</td>
</tr>
<tr>
<td>1998</td>
<td>1999</td>
<td>2001</td>
<td>2004</td>
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<tr>
<td>1999</td>
<td>2000</td>
<td>2002</td>
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<td>2000</td>
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<td>2006</td>
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<td>2002</td>
<td>2003</td>
<td>2005</td>
<td>2008</td>
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<td>2003</td>
<td>2004</td>
<td>2006</td>
<td>2009</td>
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<tr>
<td>2004</td>
<td>2005</td>
<td>2007</td>
<td>2010</td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>2008</td>
<td>2011</td>
</tr>
<tr>
<td>2006</td>
<td>2007</td>
<td>2009</td>
<td>2012</td>
</tr>
</tbody>
</table>

For each of the fifty states, data were examined prior to and after implementation of the statewide mandatory remediation policy. Dummy variables were created for each state and for each year for which data were available. A dichotomous variable was used to indicate whether or not a policy was in place for each state during a particular year. Therefore, each state was compared to itself prior to and after implementation of the policy, utilizing a pre-policy and post-policy comparison group.

**State and Institutional Contexts**

In addition to examining the effects of statewide mandatory remediation policies nationally, this study also examined the impact of such measures on state higher education systems. In order to provide empirical evidence for other states considering the
implementation of statewide mandatory remediation policies, this study specifically utilized data from the state of Colorado to explore: What is the impact of statewide mandatory remediation policies on college student retention for two-year and four-year postsecondary institutions at the state and institutional levels?

Dataset

For this study, data were collected from the Integrated Postsecondary Education Data System (IPEDS) for all public four-year and two-year higher education institutions, including vocational or occupational programs, within the state of Colorado. The United States Air Force Academy is one such public four-year university in Colorado; however, as a federal institution it does not fall under the purview of Colorado’s statewide remediation policy, so it was removed from analysis.

IPEDS offers information on many different success variables, but this study relied primarily on second-year retention rates. Data constraints prohibited analyzing graduation rates within 150 percent of time for four-year institutions. Because Colorado’s statewide mandatory remediation policy was implemented in 2005, sufficient post-policy data for graduation rates for four-year postsecondary institutions were unavailable at the time of the analysis since these cohorts would not be graduating until 2011. Graduation rates for two-year public institutions were able to be analyzed with available data. As a result, the impact of Colorado’s remediation policy could only be evaluated based on graduation rates for public two-year community colleges along with retention rates for all public postsecondary institutions.
Model for Analysis

Similar to the national portion of this study, a fixed effects model was used to analyze panel data for each year between 2002 and 2009 to determine the policy’s impact on the state of Colorado as a whole, the community college level, the four-year institution level, and each of the 27 public postsecondary institutions individually. Because Colorado’s statewide mandatory remediation policy was implemented in 2005, analyzing several years of data on either side of the change should provide ample evidence of whether differences existed at the state or institutional level as a result of the policy implementation. Using fixed effects, characteristics of each institution remained constant while comparing effects of the policy within each institution rather than among heterogeneous institutions. Similarly, each institutional level (two-year or four-year) was compared to itself in an effort to account for unobserved differences between educational missions, programs, and student populations.

Because fixed effects models do not account for factors that change over time, such as the institution’s student demographic, variables were included to account for time-variant characteristics which might affect the regression. Several studies point to relationships which exist between persistence and student compositional characteristics. For example, part-time students tend to graduate at lower rates, perhaps due to a lack of academic or social engagement with the institution (Titus, 2004; Toutkoushian & Smart, 2001; Winston & Zimmerman, 2004). Hence, this study included the percentage of part-time enrollment in an effort to capture indirect or peer effects. Racial diversity may also create a peer effect, so this study included the percentage of non-white students as a time-variant characteristic as well.
Financial characteristics may also impact persistence and degree completion. For example, students receiving more federal grant aid, primarily comprised of need-based Pell grants awarded to low- and middle-income students, could act as a proxy for the relative income level of the student body (Bailey et al., 2005). Since the socio-economic status of students impacts graduation and retention rates (Bettinger & Long, 2009), this study included a time-variant variable for the percentage of students receiving federal grant assistance.

Finally, institutional expenditures in instruction and academic support are likely to have a positive effect on the likelihood of student success. Titus (2004) and Ryan (2004) found negative effects for academic support in four-year institutions and claimed that these expenses may be diverting funds from more effective expenditures like instruction. Ryan (2004), however, argued that it is possible that postsecondary institutions could spend more on student services and still not be able to help their students overcome the multiple barriers to success that they face. Nonetheless, this study included both instructional and academic support expenditures per full-time student as time-variant characteristics that may alter the effects of statewide mandatory remediation policies on student success.

The resulting model utilized was:

\[ y_{it} = \gamma_0 + \gamma_1(\text{policy})_{it} + \gamma_2(\text{minority})_{it} + \gamma_3(\text{PTenr})_{it} + \gamma_4(\text{fedgrant})_{it} + \gamma_5(\text{instexp})_{it} + \gamma_6(\text{acadsuppexp})_{it} + \alpha_i + \varepsilon_{it} \]

where:

- \( y_{it} \) = dependent variable of either the graduation rate or retention rate observed for each individual institution \( i \) at time \( t \)
\( \gamma_0 = \) intercept

\( \gamma_1 \ldots \gamma_6 = \) effects of the respective variables

\( \text{policy}_{it} = \) time-variant regressor of policy implementation

\( \text{minority}_{it} = \) time-variant regressor of percent of non-white students

\( \text{PTenr}_{it} = \) time-variant regressor of percent of students enrolled part-time

\( \text{fedgrant}_{it} = \) time-variant regressor of percent of students receiving federal grants

\( \text{instexp}_{it} = \) time-variant regressor of instructional expenditures per full-time student

\( \text{acadsuppexp}_{it} = \) time-variant regressor of academic support expenditures per full-time student

\( \alpha_i = \) unobserved individual institutional effect

\( \varepsilon_{it} = \) error term

All data were analyzed based on the year of policy implementation. Because statewide remediation policies impact incoming freshmen, graduation rates were included for the years in which a cohort would have graduated after 150\% of time. For example, a 1997 policy implementation for a state required examination of the 1991 entering cohort for a four-year institution who would have graduated within 150\% of time after six years. One may also view this as \( t+6 \) for four-year institutions and \( t+3 \) for two-year institutions. Similarly, retention rates were evaluated based on the year in which a cohort entered and was retained one year later, in other words \( t+1 \). (See Table 4).
Table 4

*Years of Colorado Policy Analysis*

<table>
<thead>
<tr>
<th>Beginning Cohort Year $(t)$</th>
<th>Retention Year $(t+1)$</th>
<th>3-year Cohort Graduation Year $(t+3)$</th>
<th>6-year Cohort Graduation Year $(t+6)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>2003</td>
<td>2005</td>
<td>2008</td>
</tr>
<tr>
<td>2003</td>
<td>2004</td>
<td>2006</td>
<td>2009</td>
</tr>
<tr>
<td>2004</td>
<td>2005</td>
<td>2007</td>
<td>2010</td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>2008</td>
<td>2011</td>
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<tr>
<td>2006</td>
<td>2007</td>
<td>2009</td>
<td>2012</td>
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<tr>
<td>2007</td>
<td>2008</td>
<td>2010</td>
<td>2013</td>
</tr>
<tr>
<td>2008</td>
<td>2009</td>
<td>2011</td>
<td>2014</td>
</tr>
<tr>
<td>2009</td>
<td>2010</td>
<td>2012</td>
<td>2015</td>
</tr>
</tbody>
</table>

For each institution included in the analysis, data from IPEDS were examined prior to and after implementation of the statewide mandatory remediation policy in fall 2005. Dummy variables were created for each institution and for each year for which data were available. A dichotomous variable was used to indicate whether or not a policy was in place for each institution during a particular year. Therefore, each institution was compared to itself prior to and after implementation of the policy, utilizing a pre-policy and post-policy comparison group.
CHAPTER IV

RESULTS

The National Context

In order to provide empirical evidence for other states considering the implementation of statewide mandatory remediation policies, this study first examined the effects of such initiatives on state-level postsecondary graduation and persistence rates. Currently, eleven states require the most restrictive policies for statewide mandatory remediation of entering college students with provisions for the use of common tests and standardized cut scores. Dates of policy implementation vary widely among states, but most policies have been implemented since 2000, suggesting an increasingly popular initiative in recent years (see Table 5).

Table 5

Current Statewide Mandatory Remediation Policies, by State

<table>
<thead>
<tr>
<th>State</th>
<th>Year of Policy Impl.</th>
<th>Statewide Placement Policy</th>
<th>Statewide Common Test</th>
<th>Statewide Common Cut Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>1991</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Colorado</td>
<td>2005</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Florida</td>
<td>1992</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Georgia</td>
<td>1992</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Idaho</td>
<td>1989</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>developing</td>
</tr>
<tr>
<td>Louisiana</td>
<td>2005</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>1998</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>developing</td>
</tr>
<tr>
<td>Mississippi</td>
<td>2000</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2000</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Texas</td>
<td>2003</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>West Virginia</td>
<td>2002</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
Degree Completion

In order to examine the impact of statewide mandatory remediation policies on college student degree completion rates, state graduation rates within 150 percent of time required for the degree program (three years for community colleges and six years for four-year institutions) were utilized for student cohorts beginning between 1991 and 2006. All data were collected from the Student Pipeline dataset aggregated from several national databases by NCHEMS.

To account for time-variant characteristics related to state academic and financial background, the regression included variables for state high school graduation rates, high school to college entry rates, and higher education spending per pupil. Hence, the model used for the analysis was:

\[ \text{Grad}_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 \text{Policy}_{it} + \epsilon_{it}, \]

with \( x_{it} \) equal to dummy variables for states and years of policy implementation, along with individual state high school graduation rates, high school to college entry rates, and higher education spending per pupil over time. Policy\(_{it} \) indicated a dichotomous variable for whether or not the statewide mandatory remediation policy was implemented for a particular state in a specific year.

First, effects of the policies on 3-year community college graduation rates were investigated. State-level data for cohorts of students who began taking courses at public community colleges in each state between 1994 and 2006 were included in the analysis. Seven states implemented statewide mandatory remediation policies prior to or after the graduation dates available for analysis: Colorado, Louisiana, Massachusetts, Mississippi, South Dakota, Texas and West Virginia. After controlling for high school graduation
rates, high school to college entry rates, and higher education spending per pupil, a significant relationship was not observed \( (p = .498, n = 661) \) between implementing a statewide mandatory remediation policy and 3-year associate’s degree completion at the community college level. Without controlling for state academic characteristics, even less significance was observed \( (p = .500, n = 661) \). In other words, implementing a statewide mandatory remediation policy showed no significant effect on 3-year graduation rates (see Table 6).

Table 6  
Impact of Statewide Mandatory Remediation Policies on State-level Associate’s Degree Completion Within 150% of Time

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE</th>
<th>Adjusted R²</th>
<th>N</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Alone</td>
<td>-1.92</td>
<td>2.82</td>
<td>.75</td>
<td>661</td>
<td>.498</td>
</tr>
<tr>
<td>State Variables</td>
<td>-2.01</td>
<td>2.96</td>
<td>.75</td>
<td>661</td>
<td>.500</td>
</tr>
<tr>
<td>H.S. Grad. Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.S. to College Entry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Ed. Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( B = \) unstandardized regression coefficient; \( SE = \) standard error \( B \)
\( Adjusted R^2 = \) amount of variance explained by the model

\*\( p < .05 \),  \**\( p < .01 \),  \***\( p < .001 \)

Next, the impact of the policies on 6-year graduation rates were analyzed. State-level data from students who began coursework at 4-year public institutions in each state between 1991 and 2003 were included in the analysis. Five states implemented statewide mandatory remediation policies during the time frame of the data: Massachusetts, Mississippi, South Dakota, Texas, and West Virginia. Like 3-year graduation rates, statewide mandatory remediation policies appeared to have no significant effect \( (p = .987, n = 663) \) on 6-year graduation rates. Removing state academic and financial characteristics from the model also showed no significant effect on 6-year graduation
rates \( (p = .567, n = 663) \). However, in both cases, Adjusted \( R^2 \) indicated that 94\% of the variance was explained by the model. Hence, findings from a fixed effects model show that standardizing and requiring remedial education did not significantly impact state graduation rates within 150 percent of degree completion time at 4-year public postsecondary institutions across the country (see Table 7).

Table 7
Impact of Statewide Mandatory Remediation Policies on State-level Bachelor’s Degree Completion Within 150\% of Time

<table>
<thead>
<tr>
<th>Model</th>
<th>6-year Graduation Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B )</td>
</tr>
<tr>
<td>Policy Alone</td>
<td>.294</td>
</tr>
<tr>
<td>State Variables</td>
<td>-.007</td>
</tr>
<tr>
<td>H.S. Grad. Rate</td>
<td></td>
</tr>
<tr>
<td>H.S. to College Entry</td>
<td></td>
</tr>
<tr>
<td>Higher Ed. Spending</td>
<td></td>
</tr>
</tbody>
</table>

\( B = \) unstandardized regression coefficient; \( SE = \) standard error \( B \)

\( Adjusted R^2 = \) amount of variance explained by the model

\(*p < .05, \ \ **p < .01, \ \ ***p < .001\)

Retention

Because most statewide mandatory remediation policies require remedial coursework to be taken in the first year of college, first-year retention rates should be plausible indicators of policy impact. As a result, this study investigated effects of statewide mandatory remediation policies on retention rates after one year of college. State-level postsecondary retention rates for each state between 2000 and 2008 from the \textit{Measuring Up} study conducted by the National Center for Public Policy and Higher Education were analyzed. Four states implemented the policy since 2000: Colorado, Louisiana, Texas, and West Virginia.
To account for time-variant characteristics related to state academic and financial background, the regression also included variables for state high school graduation rates, high school to college entry rates, and higher education spending per pupil. Hence, the model used for the analysis was:

$$Retention_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 Policy_{it} + \epsilon_{it},$$

with $x_{it}$ equal to dummy variables for states and years of policy implementation, along with individual state high school graduation rates, high school to college entry rates, and higher education spending per pupil over time. $Policy_{it}$ indicated a dichotomous variable for whether or not the statewide mandatory remediation policy was implemented for a particular state in a specific year.

First, states were analyzed based on the rates of students returning to 2-year colleges after one year. After controlling for time-variant characteristics of state high school graduation rates, high school to college entry rates, and higher education spending per pupil, implementing a statewide mandatory remediation policy appeared to have no significant effect on retention rates for 2-year colleges ($p = .144, n = 229$). Removing state academic and financial characteristics from the model produced similar results. Without controlling for state high school graduation rates, high school to college entry rates, and higher education spending per pupil, implementing a statewide mandatory remediation policy did not significantly alter retention rates for 2-year colleges ($p = .125, n = 229$). Hence, the impact of statewide remediation policies on state-level 2-year college retention rates was not significant (see Table 8).
Table 8.
*Impact of Statewide Mandatory Remediation Policies on State-level Retention at 2-year Postsecondary Institutions*

<table>
<thead>
<tr>
<th>Model</th>
<th>2-year College Retention Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Policy Alone</td>
<td>4.06</td>
</tr>
<tr>
<td>State Variables</td>
<td>3.61</td>
</tr>
<tr>
<td>H.S. Grad. Rate</td>
<td></td>
</tr>
<tr>
<td>H.S. to College Entry</td>
<td></td>
</tr>
<tr>
<td>Higher Ed. Spending</td>
<td></td>
</tr>
</tbody>
</table>

*B = unstandardized regression coefficient; SE = standard error B
Adjusted $R^2 = amount of variance explained by the model
*p < .05, **p < .01, ***p < .001

Next, policy effects were explored for 4-year postsecondary institutions. Controlling for state high school graduation rates, high school to college entry rates, and higher education spending per pupil demonstrated that implementing statewide mandatory remediation policies had no significant effect on state-level retention at four-year colleges and universities ($p = .858, n = 246$). Not accounting for state academic and financial characteristics resulted similarly. Implementing a statewide mandatory remediation policy without controlling for state academic and financial characteristics resulted in no significant effect ($p = .797, n = 246$). Hence, implementing statewide mandatory remediation policies did not significantly impact state-level retention rates at four-year postsecondary institutions (see Table 9).
Table 9

*Impact of Statewide Mandatory Remediation Policies on State-level Retention at 4-year Postsecondary Institutions*

<table>
<thead>
<tr>
<th>Model</th>
<th>4-year College Retention Rates</th>
<th>B</th>
<th>SE</th>
<th>Adjusted R²</th>
<th>N</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Alone</td>
<td></td>
<td>-.366</td>
<td>1.41</td>
<td>.89</td>
<td>246</td>
<td>.797</td>
</tr>
<tr>
<td>State Variables</td>
<td></td>
<td>-.257</td>
<td>1.43</td>
<td>.89</td>
<td>246</td>
<td>.858</td>
</tr>
<tr>
<td>H.S. Grad. Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.S. to College Entry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Ed. Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*B = unstandardized regression coefficient; SE = standard error B
Adjusted R² = amount of variance explained by the model
*p < .05, **p < .01, ***p < .001

**Summary**

Results from the national portion of this study suggest that statewide mandatory remediation policies have no significant impact on state-level student success outcomes for public higher education settings. The policies did not demonstrate significant effect on 3-year graduation rates for community colleges, nor did they show significant effect on 6-year graduation rates for four-year public postsecondary institutions. Similarly, state-level retention rates for students returning to public two-year colleges or four-year postsecondary institutions did not appear to significantly change as a result of statewide mandatory remediation policies. Adding time-variant state-level variables of high school graduation rates, high school to college completion rates, and higher education spending per pupil did not greatly alter the variance accounted for in each fixed effects model.

**State and Institutional Contexts**

In addition to examining the impact of statewide mandatory remediation policies on state-level postsecondary graduation and retention rates across the country, this study investigated policy effects on public higher education institutions in Colorado.
specifically. Currently, 28 public colleges and universities operate in Colorado—13 four-year institutions and 15 two-year institutions. In addition, non-public degree granting and private occupational schools provide education beyond high school in the State. Figure 2 below best illustrates a summary of higher education in Colorado.

*Figure 2. Summary of Colorado Higher Education Institutions, by Category, http://highered.colorado.gov/Data/AtAGlance.html*

![Diagram of Colorado Higher Education Institutions](http://highered.colorado.gov/Data/AtAGlance.html)

Descriptive statistics for each of the postsecondary institutions in Colorado revealed several important distinctions between institutional size and student demographics (see Table 10). Higher education institutions vary widely in total enrollment, but more specifically the proportion of part-time and minority students served. The percent receiving need-based federal grants is a plausible indicator of the socioeconomic status of students, also varying widely among institutions. In addition, the amount of money spent on instructional expenses per full-time student shows how institutions choose to dedicate different amounts to instruction despite often similar tuition rates, as in the case of Colorado community colleges.

One important distinction required eliminating the institution altogether from analysis for the study. The United States Air Force Academy (USAFA) is categorized as a public four-year university in Colorado; however, as a federal institution it does not fall under the purview of Colorado’s statewide mandatory remediation policy, so it was
removed from this analysis. Despite this fact, descriptive statistics were included for USAFA below to illustrate other distinctions that might have swayed data analysis, such as each student receiving 100% financial assistance from the federal government to attend and the much larger instructional expenditures per student due to the distinct aeronautical mission of the institution. All other 27 public postsecondary institutions were included in the analysis for this study.

Table 10
**Summary of Colorado Public Postsecondary Institutional Data Collected from IPEDS, 2010**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>5510</td>
<td>61</td>
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<td>37</td>
<td>5364</td>
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<tr>
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</tr>
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<td>77</td>
<td>25</td>
<td>18</td>
<td>6929</td>
</tr>
<tr>
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<td>61</td>
<td>18</td>
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<td>51</td>
<td>63</td>
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<td>Pikes Peak Community College</td>
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<tr>
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<td>3324</td>
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<td>Trinidad State Junior College</td>
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<td>63</td>
<td>4485</td>
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<td>4-year Public Postsecondary Institutions</td>
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<td>5976</td>
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<td>16</td>
<td>8047</td>
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<tr>
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<td>3578</td>
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<td>37</td>
<td>24</td>
<td>4680</td>
</tr>
<tr>
<td>Mesa State College</td>
<td>7042</td>
<td>27</td>
<td>23</td>
<td>28</td>
<td>4226</td>
</tr>
<tr>
<td>Metropolitan State College of Denver</td>
<td>22837</td>
<td>37</td>
<td>35</td>
<td>27</td>
<td>4009</td>
</tr>
</tbody>
</table>
United States Air Force Academy | 4620 | 0 | 27 | 100 | 27787
University of Colorado at Colo. Springs | 9733 | 38 | 25 | 21 | 5478
University of Colorado Boulder | 33010 | 17 | 24 | 12 | 10209
University of Colorado Denver | 23715 | 52 | 37 | 25 | 17329
University of Northern Colorado | 12711 | 21 | 27 | 18 | 5360
Western State College of Colorado | 2237 | 9 | 23 | 21 | 6176

Recent descriptive statistics for Colorado two-year and four-year postsecondary institutions show retention rates that are similar to national averages. Four-year college graduation rates are more closely aligned to the national mean than two-year college degree completion rates. Colorado’s two-year college graduation rates are 10% higher than the national mean (39% for Colorado versus 29% for the nation). Colorado’s statewide mandatory remediation policy could be one contributing factor to this positive difference.

Rates for remediation in at least one subject vary widely based on the institution, institutional level, and when comparing Colorado to national averages. For example, University of Colorado at Colorado Springs boasts a 0.5% remediation rate while the Community College of Denver remediates 69% of its first-time recent high school graduates. These statistics also demonstrate how Colorado’s statewide remediation policy has shifted the burden of remedial education to community colleges. Greater proportions of students are remediated at the community college level than at the four-year postsecondary institutional level, especially when compared with national averages (see Table 11).
Table 11
Summary of National and Colorado Public Postsecondary Institutional Retention, Graduation, and Remediation Data Collected from NCHEMS and IPEDS, 2010

<table>
<thead>
<tr>
<th>2-year Public Postsecondary Institutions</th>
<th>Total Enroll.</th>
<th>Retention Rate 2009-10</th>
<th>Grad. Rate 2009</th>
<th>% Remediated at least one subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATIONAL</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>COLORADO</td>
<td></td>
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<td>Aims Community College</td>
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<td>Arapahoe Community College</td>
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<td>Colorado Mountain College</td>
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<td>Colorado NW Comm. College</td>
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<td>Community College of Aurora</td>
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<td>Community College of Denver</td>
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<td>69</td>
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<td>Front Range Comm. College</td>
<td>18713</td>
<td>57</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>Lamar Community College</td>
<td>1080</td>
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<td>Red Rocks Community College</td>
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<td>65</td>
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</table>

<table>
<thead>
<tr>
<th>4-year Public Postsecondary Institutions</th>
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<th></th>
</tr>
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<td>58</td>
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<td>Colorado School of Mines</td>
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<td>67</td>
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<td>Colorado State University</td>
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<td>Fort Lewis College</td>
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<td>29</td>
<td>47</td>
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<td>Metropolitan State College of Denver</td>
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<td>21</td>
<td>39</td>
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<tr>
<td>University of Colorado Colo. Springs</td>
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<td>26</td>
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<td>University of Northern Colorado</td>
<td>12711</td>
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<td>28</td>
</tr>
<tr>
<td>Western State College of Colorado</td>
<td>2237</td>
<td>59</td>
<td>39</td>
<td>40</td>
</tr>
</tbody>
</table>
Degree Completion

In order to examine the impact of statewide mandatory remediation policies on college student degree completion rates, graduation rates within 150 percent of time required for the degree program (three years for community colleges) for each Colorado public institution were utilized for student cohorts beginning between fall 2003 and fall 2007. Insufficient graduation rate data were available for four-year institutions in Colorado. In order to establish effects from Colorado’s statewide mandatory remediation policy implemented in 2005, graduation rates within 150 percent of time required for the degree program (six years for four-year institutions) would necessitate post-policy data for cohorts graduating in 2010-11. This data was not publicly available at the time of this study, nor would only one post-policy cohort establish sufficient effects for the policy in question. As a result, only graduation rates for two-year public postsecondary institutions in the state of Colorado were analyzed. With a policy implementation date of 2005, the analysis examined two years of pre-policy institutional data (indicated by a dichotomous variable of 0) and three years of post-policy institutional data (indicated by a dichotomous variable of 1).

To account for institutional time-variant characteristics related to student demographics and finances, the regression included variables for percent of minority students, percent of students enrolled part-time, percent of students receiving need-based federal grants, instructional expenditures per full-time student, and academic support expenditures per full-time student. The resulting model used for the analysis was:

\[ \text{Grad}_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 \text{Policy}_{it} + \varepsilon_{it}, \]
with \( x_i \) equal to dummy variables for postsecondary institutions and years of policy implementation, along with percent of minority students, percent of students enrolled part-time, percent of students receiving need-based federal grants, instructional expenditures per full-time student, and academic support expenditures per full-time student over time. Policy \( n \) indicated a dichotomous variable for whether or not the statewide mandatory remediation policy was implemented for an individual institution in a specific year.

Graduation rates within 150 percent of time to degree completion (three years for community colleges) were utilized for all fifteen public two-year community colleges in Colorado. Statewide data for cohorts of students who began taking courses at public community colleges in Colorado between 2003 and 2007 (graduating between 2006 and 2010) were included in the analysis. Descriptive statistics revealed a mean graduation rate of 26.14% with a standard deviation of 11.47. Institutional graduation rates varied from 10 to 54 percent among Colorado community colleges during the years of analysis.

Without controlling for student demographics or institutional characteristics, no significant relationship was observed \((p = .441, n = 75)\) between implementing a statewide mandatory remediation policy and three-year associate’s degree completion at the community college level. After controlling for time-variant student demographic characteristics of percent of minority students, percent of students enrolled part-time, and percent of students receiving need-based federal grants, a significant relationship was still not observed \((p = .355, n = 75)\) between implementing a statewide mandatory remediation policy and 3-year associate’s degree completion at the community college level. Controlling for time-variant institutional characteristics of instructional
expenditures per full-time student and academic support expenditures per full-time student yielded similar non-significant results ($p = .344, n = 75$). Finally, including all student and institutional time-variant variables did not find significant impact of the policy’s implementation on graduation rates ($p = .295, n = 75$), but including all variables in the model did improve the reported variance being explained to 73%. In summary, implementing a statewide mandatory remediation policy showed no significant effect on 3-year degree completion rates for Colorado community colleges (see Table 12).

### Table 12

**Impact of Statewide Mandatory Remediation Policies on Associate’s Degree Completion Within 150% of Time for Colorado Community Colleges**

<table>
<thead>
<tr>
<th>Model</th>
<th>3-year Graduation Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
</tr>
<tr>
<td>Policy Alone</td>
<td>-2.93</td>
</tr>
<tr>
<td>Student Variables</td>
<td>-4.17</td>
</tr>
<tr>
<td>PT Enrollment</td>
<td></td>
</tr>
<tr>
<td>Minority</td>
<td></td>
</tr>
<tr>
<td>Fed. Grants</td>
<td></td>
</tr>
<tr>
<td>Institution Variables</td>
<td>-3.97</td>
</tr>
<tr>
<td>Instruct. Exp.</td>
<td></td>
</tr>
<tr>
<td>Acad. Supp. Exp.</td>
<td>-4.94</td>
</tr>
</tbody>
</table>

$B =$ unstandardized regression coefficient; $SE =$ standard error $B$

$Adjusted R^2 =$ amount of variance explained by the model

*p* < .05, **p** < .01, ***p*** < .001

### Retention

Along with graduation rates, this study investigated the effect of statewide mandatory remediation policies on retention rates after one year of college. Because Colorado’s statewide mandatory remediation policy requires remedial coursework to be taken in the first year of college, first-year retention rates should be plausible indicators of policy impact. Retention rates were collected from IPEDS by using institutional-level
postsecondary data for Colorado student cohorts who entered college between fall 2003 and fall 2009 and were still attending college one year later. With a policy implementation date of 2005, the analysis examined two years of pre-policy institutional data (indicated by a dichotomous variable of 0) and five years of post-policy institutional data (indicated by a dichotomous variable of 1).

To account for institutional time-variant characteristics related to student demographics and institutional finances, the regression included variables for percent of minority students, percent of students enrolled part-time, percent of students receiving need-based federal grants, instructional expenditures per full-time student, and academic support expenditures per full-time student. The resulting model used for the analysis was:

\[ Retention_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 Policy_{it} + \epsilon_{it}, \]

with \( x_{it} \) equal to dummy variables for postsecondary institutions and years of policy implementation, along with percent of minority students, percent of students enrolled part-time, percent of students receiving need-based federal grants, instructional expenditures per full-time student, and academic support expenditures per full-time student over time. \( Policy_{it} \) indicated a dichotomous variable for whether or not the statewide mandatory remediation policy was implemented for an individual institution in a specific year.

Retention rates within 150 percent of time to degree completion (three years for community colleges) were utilized for all public two-year community colleges and four-year postsecondary institutions (except USAFA). Statewide data for cohorts of students who began taking courses at public colleges and universities in Colorado between fall
2003 and fall 2009 and remained in attendance one year later were included in the analysis. Descriptive statistics revealed a mean retention rate of 59.77% with a standard deviation of 10.80 for all Colorado postsecondary institutions. A closer look at the four-year institutional level revealed a mean retention rate of 65.42% with a standard deviation of 10.24. Two-year institutions showed the lowest average retention rate of 53.77% with a standard deviation of 6.63. Institutional retention rates varied from 49 to 89 percent among four-year public institutions, from 30 to 71 percent among two-year public community colleges, and from 30 to 89 percent among all Colorado public colleges and universities during the years of analysis.

Without controlling for student demographics or institutional characteristics, a significant positive relationship was observed \((p = .000, n = 241)\) between implementing a statewide mandatory remediation policy and retention rates for Colorado public postsecondary institutions. Implementing the policy increased the rate of students returning to college the next year by approximately 4.2\% \((b = 4.23, SE = .93)\). After controlling for time-variant student demographic characteristics of percent of minority students, percent of students enrolled part-time, and percent of students receiving need-based federal grants, a slightly less significant relationship was observed \((p = .001, n = 241)\) between implementing a statewide mandatory remediation policy and institutional retention rates, but a larger positive effect of 5.4\% was reported \((b = 5.42, SE = 1.44)\). Controlling for time-variant institutional characteristics of instructional expenditures per full-time student and academic support expenditures per full-time student yielded similar significant positive results \((p = .001, n = 189)\), showing a 4.7\% increase in institutional retention rates \((b = 4.70, SE = 1.25)\) with policy implementation. Finally, including all
student and institutional time-variant variables continued to find significant impact of the policy’s implementation \( (p = .004, n = 189) \) of over 5.6\% \( (b = 5.65, SE = 1.76) \) on institutional retention rates. Hence, implementing a statewide mandatory remediation policy showed significant positive impact on institutional retention rates by between four and six percent for Colorado colleges and universities (see Table 13).

Table 13  

<table>
<thead>
<tr>
<th>Model</th>
<th>Retention Rates</th>
<th>( B )</th>
<th>SE</th>
<th>Adjusted ( R^2 )</th>
<th>N</th>
<th>Sig.</th>
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<tr>
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<td>.93</td>
<td>.82</td>
<td>241</td>
<td>.000</td>
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<td>Student Variables</td>
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<td>1.44</td>
<td>.82</td>
<td>241</td>
<td>.001</td>
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<tr>
<td>PT Enrollment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fed. Grants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institution Variables</td>
<td></td>
<td>4.70**</td>
<td>1.25</td>
<td>.81</td>
<td>189</td>
<td>.001</td>
</tr>
<tr>
<td>Instruct. Exp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Variables</td>
<td></td>
<td>5.65**</td>
<td>1.76</td>
<td>.82</td>
<td>189</td>
<td>.004</td>
</tr>
</tbody>
</table>

\( B \) = unstandardized regression coefficient; \( SE \) = standard error \( B \)  
\( Adjusted R^2 \) = amount of variance explained by the model  
\*\( p < .05 \),  **\( p < .01 \),  ***\( p < .001 \)

Next, policy effects were explored for solely 4-year public postsecondary institutions in Colorado. Without controlling for student demographics or institutional characteristics, a significant positive relationship was observed \( (p = .022, n = 106) \) between implementing a statewide mandatory remediation policy and institutional retention rates for Colorado public four-year postsecondary institutions. Implementing the policy increased the rate of students returning to college the next year by approximately 2.1\% \( (b = 2.12, SE = .80) \). After controlling for time-variant student demographic characteristics of percent of minority students, percent of students enrolled
part-time, and percent of students receiving need-based federal grants, a slightly less significant relationship was observed \((p = .027, n = 106)\) between implementing a statewide mandatory remediation policy and institutional retention rates, but a larger positive effect of 2.7% was implicated \((b = 2.73, SE = 1.07)\). In contrast, controlling for time-variant institutional characteristics of instructional expenditures per full-time student and academic support expenditures per full-time student yielded no significant results \((p = .379, n = 84)\). Similarly, including all student and institutional time-variant variables showed no significant impact on institutional retention rates from the policy’s implementation \((p = .552, n = 84)\). In summary, implementing a statewide mandatory remediation policy showed mixed effects on four-year institutional retention rates, depending on the time-variant variables included in the model. Adding student demographic characteristics or examining the policy without any time-variant characteristics showed between a 2 and 3 percent impact on retention rates for Colorado four-year colleges and universities (see Table 14).
Table 14
Impact of Statewide Mandatory Remediation Policies on Retention Rates at Colorado 4-year Public Postsecondary Institutions

<table>
<thead>
<tr>
<th>Model</th>
<th>4-year Retention Rates</th>
<th>B</th>
<th>SE</th>
<th>Adjusted R²</th>
<th>N</th>
<th>Sig.</th>
</tr>
</thead>
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<tr>
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<td>.80</td>
<td>.94</td>
<td>106</td>
<td>.022</td>
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<td>1.07</td>
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<td>.027</td>
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<tr>
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<tr>
<td>Fed. Grants</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institution Variables</td>
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<td>2.12</td>
<td>.94</td>
<td>84</td>
<td>.379</td>
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<td>.552</td>
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B = unstandardized regression coefficient; SE = standard error B
Adjusted R² = amount of variance explained by the model
*p < .05, **p < .01, ***p < .001

Finally, the impact of the statewide mandatory remediation policy on two-year postsecondary institutions in Colorado was investigated. Analyzing the impact of the policy without controlling for student demographics or institutional characteristics resulted in a significant positive effect (p = .001, n = 135) between implementing a statewide mandatory remediation policy and retention rates for Colorado public two-year postsecondary institutions. Implementing the policy increased the rate of students returning to college the next year by approximately 5.9% (b = 5.90, SE = 1.40). After controlling for time-variant student demographic characteristics of percent of minority students, percent of students enrolled part-time, and percent of students receiving need-based federal grants, a less significant relationship was observed (p = .020, n = 135) between implementing a statewide mandatory remediation policy and two-year institutional retention rates, but a larger positive effect of 7.3% was reported (b = 7.25, SE = 2.77). Controlling for time-variant institutional characteristics of instructional
expenditures per full-time student and academic support expenditures per full-time student yielded significant results ($p = .000$, $n = 105$), increasing retention rates at two-year public institutions by nearly 8% ($b = 7.95$, $SE = 1.74$). Including all student and institutional time-variant variables in the fixed effects model showed the greatest significant impact of the policy’s implementation ($p = .003$, $n = 105$) by increasing two-year institutional retention rates by almost 10% ($b = 9.55$, $SE = 2.64$). In summary, implementing a statewide mandatory remediation policy appeared to positively impact two-year institutional retention rates in Colorado by approximately 6 to 10 percent, depending on the time-variant variables included in the model (see Table 15).

Table 15

Impact of Statewide Mandatory Remediation Policies on Retention Rates at Colorado 2-year Public Postsecondary Institutions

<table>
<thead>
<tr>
<th>Model</th>
<th>2-year Retention Rates</th>
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<th>N</th>
<th>Sig.</th>
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<td>$SE$</td>
<td>$Adjusted R^2$</td>
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<td>Fed. Grants</td>
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<tr>
<td>Institution Variables</td>
<td>7.95***</td>
<td>1.74</td>
<td>.25</td>
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</tr>
<tr>
<td>All Variables</td>
<td>9.55**</td>
<td>2.64</td>
<td>.29</td>
<td>105</td>
<td>.003</td>
</tr>
</tbody>
</table>

$B =$ unstandardized regression coefficient; $SE =$ standard error $B$

$Adjusted R^2 =$ amount of variance explained by the model

*p < .05, **p < .01, ***p < .001

Summary

Results from the state and institutional portion of this study suggest that statewide mandatory remediation policies have a significant impact on student success outcomes for public higher education settings. While Colorado’s statewide mandatory remediation
policy demonstrated no significant effect on 3-year graduation rates for community colleges, the policy did positively impact institutional retention rates. Rates for students returning to 2-year colleges appeared to significantly improve as a result of the policy by as much as 10 percent. Results for 4-year institutions showed less impact but improved retention rates by 2 to 3 percent. Overall, Colorado colleges and universities have experienced a 4 to 6 percent increase in retention rates as a result of implementing a statewide mandatory remediation policy. Adding time-variant student demographic and institutional spending variables for percent of minority students, percent of students enrolled part-time, percent of students receiving need-based federal grants, instructional expenditures per full-time student, and academic support expenditures per full-time student did not greatly alter the variance accounted for in each model, but it did sometimes change the level of significance resulting from the fixed effects.

**Limitations**

Threats to validity posed a concern. The policy (treatment) may not have been applied uniformly to all subjects. For example, data did not account for variation within states or institutions, including discrepancies related to how policies were actually implemented (e.g., exemptions granted and multiple placement testing opportunities). Furthermore, remediation coursework at the institutional level (i.e., what’s actually taught in the classes) can vary widely, causing difficulty in establishing causality related to the policy itself.

Of additional concern, not all of the states that implemented statewide mandatory remedial education policies and common cutoff scores could be analyzed using the data available. Several states which implemented strict remediation policies could not be
evaluated because both pre-policy and post-policy data were not available. Although conclusions could be drawn regarding the states that were analyzed, incorporating fewer states reduced power of the implications from the study.

Examining institutions within the state of Colorado offered a unique set of limitations. Primarily, the statewide mandatory remediation policy was implemented at all public institutions in the same year—2005. It is unclear if the effects seen for 2005 and later were due solely to the statewide mandatory remediation policy or some other state-level policies that may have changed during that time frame. Additionally, using the same date for institutional analyses resembled more of a differences-in-differences model rather than fixed effects. While this complication did not likely change the results, it may have caused confusion for researchers reviewing the study.

Finally, since the NCHEMS Student Pipeline data is collected from various sources, reliability was a concern. It was difficult to determine the exact origination of the data for each state or the specific data collection technique used for each variable. In addition, statewide retention and degree completion rates, including those from Colorado, included only recent students who enrolled in in-state, public postsecondary institutions. Those who enrolled in private institutions or who were reported by institutions with missing data were not included in this study. Given the lack of availability of statewide longitudinal data for students in transition, these reliability concerns remained limitations of the study without resolution, but the data included were still believed to be a reasonable representation of the current remedial landscape of Colorado and the nation as a whole.
CHAPTER V

DISCUSSION

Conclusion

While this quantitative research study did not address specifically whether remedial education courses help individual students succeed, it did explore whether sweeping statewide legislation which mandates remediation based on cutoff scores from standardized tests impacts state-level and institutional-level retention and degree completion rates. Findings from this study offer new insights regarding the effectiveness of remediation that should provide evidence for state policymakers who are considering moving forward with such statewide mandates. Unfortunately, results were mixed, which complicates the implications for future policy initiatives.

Overall, statewide mandatory remediation policies showed no significant effect on state-level graduation rates for either the two-year or four-year institutional levels. Similarly, the institutional-level analysis revealed no significant impact on graduation rates for two-year public postsecondary institutions in Colorado. These findings beg the question of whether instituting such policies is meeting the intended objective of the legislation—improving degree completion. With an increasing drive to strengthen college graduation rates, states are looking toward these policies to make a difference. A closer look at the national scene as well as one state’s higher education system reveals little evidence to support that such measures are helping.

Although statewide mandatory remediation policies did not demonstrate a significant effect on graduation rates for community colleges or four-year institutions
across the nation, the policies did show a significant positive effect on retention rates at the institutional level in Colorado. Retention rates for students returning to both two-year and four-year colleges and universities in Colorado appeared to improve significantly as a result of statewide mandatory remediation policies. Community colleges, in particular, stand to yield the greatest return on their investment in remedial education with as much as a 10 percent increase in retention rates over time. If persistence into the second year of college is an indicator of long-term success, demonstrated ultimately by degree completion, then statewide mandatory remediation policies similar to that found in Colorado show great promise. As further data become available related to graduation rates for cohorts that began after the implementation of the statewide remediation policy, especially for four-year institutions, the picture will become clearer about whether the policies are really supporting efforts to improve bachelor’s degree completion, the ultimate goal of these policies.

Implications

Few will deny that college attainment is critical to our nation’s success, especially as other countries outperform the United States, and the gap widens between educated and non-educated workers, but the question remains about how to improve degree completion rates. While college-level remediation may hold the answer for some students missing basic skills, the college readiness gap remains pervasive across the country. As identified in this study’s literature review, high school graduation does not equate to college readiness. Even though remediation supports students missing basic skills, the greater challenge is to close the gap between K-12 and postsecondary education sectors.
Statewide mandatory remediation policies are increasing across the country in an effort to smooth the transition from high school to college. Before additional states adopt these requirements, policymakers should consider the effects of such mandates. Should states allow placement decision making to remain at the postsecondary institutional level, or should remediation directives be implemented statewide in an effort to support student retention and degree completion? In an age when every student dollar matters to higher education, initiatives that keep students in school become more critical. Furthermore, as families struggle to pay for an increasingly expensive college education, striking a balance between expediting degree completion and achieving academic success intensifies. Students who are required to take remedial coursework, often at an added cost with no credit, deserve to know how these classes will help them to succeed when, on the surface, they are merely delaying the end goal of obtaining a degree.

Despite this study’s encouraging results for college student retention rates, findings must be taken with caution. It has become commonplace in the last decade to utilize first-year retention as a predictor for college graduation, but it may not be a panacea after all. More recent studies have examined whether it is the actual persistence that is propelling college students forward or the level of academic success they experience. In *The Toolbox Revisited*, Adelman (2006) showed that the rigor of a student’s high school curriculum, which then points to the level of remediation necessary during that first year of college, actually may make a greater difference in degree completion. Furthermore, Adelman (2006) points to the amount of credits a student has completed by the end of that first year, rather than actually enrolling one year later, as an indicator of success. For example, students maintaining below twenty credits by the end
of the first year are more likely to stop before completing their degree. These students may have lower credit counts because of socioeconomic reasons (e.g., having to maintain a job rather than commit to full-time studies), but they could also be suffering from being required to take several non-credit remedial courses prior to moving forward with their degree plans. Approximately 30 percent of those who were “retained” or “persisted” arrived with either fewer than twenty credits or three or more remedial courses, both significant detractors for degree completion. Adelman (2006) himself explains, “Remediation stalls student momentum” (p. 47). As states move forward to determine success measures for entering college students, looking beyond first-year retention, or even mandatory remediation, may be more fruitful.

It is clear from this study that statewide mandatory remediation policies improve college retention rates, but policymakers should be exploring initiatives that begin much earlier in a student’s academic career. For example, other states should consider replicating Lefly, Lovell, and O’Brien’s (2011) pivotal study in Colorado which showed that students needing college remediation could have been identified as early as sixth grade based on assessment scores. Policy initiatives that identify student gaps much earlier, such as the Early Assessment Program (EAP) in California and Colorado’s potential legislation to replace 10th grade state assessment with Accuplacer diagnostic testing, offer students the information they need to become college ready much earlier than fall of their freshman year in college. This new level of transparency with students may be considered “sorting” by critics but has the potential to support much smoother transitions between high school and college. Recent movements to provide Response to Intervention (RTI) and other targeted skill-based instruction for all students, not merely
those identified as needing special education services, also show great promise for addressing the individual needs of students long before college entry.

To that end, states must also implement student-level databases that transcend educational sectors in an effort to provide richer data about the student experience. As Adelman (2006) expressed in *The Toolbox Revisited*, degree completion and retention rates only provide a gross picture of what propels students to graduation. Instead, he claims that following the student, not the institution, is critical for determining what characteristics and academic behaviors explain bachelor’s degree completion. Hence, this study provides one brush stroke of a larger picture, but it in no way provides the details necessary for determining whether remediation is helping or not. Tracking students from preschool to college graduation is the only way to truly understand what measures contribute to student success.

One major factor for student retention and degree completion relies on the level of involvement or engagement the student feels within the postsecondary setting. Astin (1984) defines involvement as “the physical and psychological energy that the student devotes to the academic experience” (p. 297). Schlossberg’s (1989) theory on marginality and mattering extends this idea by emphasizing how students feeling marginalized experience negative academic outcomes. While this study focused specifically on how one policy impacted academic success as measured by retention and degree completion rates, one cannot overlook the importance of other involvement or engagement issues that may be impacting student success outcomes. Policymakers can address academic issues through policies such as statewide mandatory remedial
education, but they may be missing the more central cause of dropout rates on the postsecondary level – a lack of engagement with an institution and its student body.

Even though institutional-level retention rates in Colorado improved as a result of its statewide mandatory remediation policy, similar effects were not found when looking at policies across the country. The national portion of this study revealed no significant impact from statewide mandatory remediation policies on retention rates. In the last decade, Colorado has passed several progressive measures beyond its statewide mandatory remediation policy to improve the high school to college divide, including aligning the preK-12 and higher education systems into a combined P-20 structure, establishing an Education Success Task Force that spans all levels of education, creating a statewide student-level database that follows students throughout their entire educational experience, and adopting the Common Core State Standards to improve high school to college articulation. As a result, improvement found in the Colorado portion of this study that was not, in turn, found when studying the measure nationally, could be a reflection of other policies (or a combination therein) implemented within Colorado that were not present in the other states analyzed. More specifically, effects of Colorado’s statewide mandatory remediation policy were all analyzed around 2005, the year of policy implementation. However, other policies may have been implemented within that same year that may have overemphasized the power of the statewide policy for mandatory remediation. Regardless, provisions of Colorado’s P-20 initiatives should be considered as other states look to improve their own college retention rates, particularly if it eventually leads to improving degree completion rates as well.
One particular aspect of Colorado’s statewide remediation policy that is growing in popularity nationwide is its placement of the burden for remedial education on two-year community colleges. Colorado’s policy clearly states that only postsecondary institutions with a two-year role and mission may offer and receive state general fund support for basic skills courses. Four-year colleges may offer the courses by either contracting with a Colorado public community college or by charging the student on a cash-funded basis. It is no wonder, then, that greater effects from Colorado’s policy were seen at the community college level. These institutions are clearly bearing the brunt of remedial education in the state based on how funding is allotted for basic skills courses.

While standardizing cutoff scores for remediation appears to be improving retention rates for Colorado community colleges, the impact was much less significant for four-year institutions. This effect could be an indication of “sorting” of the poorer students. Because four-year institutions do not receive general fund support for offering these basic skills courses, admissions and advising personnel may be turning these students away. Underprepared students may be told to take coursework at the community college level first before enrolling at four-year institutions.

Comparing state statistics to national data is illuminating in this regard. Nationally, 44% of two-year public college students needed remediation, compared to 52% in Colorado. In contrast, only 18% of Colorado public four-year college students needed remediation, compared to 30% of national students at the same level (Colorado Commission on Higher Education, 2011). Evidence suggests that students requiring more support are being funneled toward community colleges rather than four-year institutions. Policymakers may argue that two-year colleges are better suited to providing
this type of basic education at a lower cost; however, four-year institutions demonstrate better student success outcomes. Are the positive outcomes from four-year institutions a function of providing a better education, or are universities merely doing a better job of pushing the more difficult students to the two-year level? As the literature review for this study suggests, the question still remains whether our country should provide educational opportunity for all (including at the four-year level) or whether sorting students in order to maintain high academic rigor is critical. Further research should explore how policies such as statewide mandatory remediation support or hinder these two sides of the debate.

As this study shows, closer examination of longitudinal data indicates that while retention rates in one state improved, statewide mandatory remediation policies nationwide do not necessarily meet the objectives as originally planned. Before states seek to direct institutions to require common placement cutoff scores, it would be wise to understand the effect of these policies on students. To that end, greater data collection is necessary to help policymakers determine how statewide initiatives affect those paying for a college education. Currently, statewide data for higher education is difficult to obtain. Organizations such as NCHEMS have attempted to bridge the gap between secondary and postsecondary arenas, and IPEDS is now offering its most recent data as searchable by state, but much more data aggregation, particularly on the student-level, is necessary in order to draw sufficient conclusions about future P-20 directions. Furthermore, policies that extend time to degree completion, increase expenses, and potentially stigmatize learners without demonstrating significant returns on academic success should be avoided. While statewide mandatory remediation policies show promise for improving student success, initiating similar mandates in other states would
be remiss without much greater investigation, particularly regarding large-scale impact using longitudinal data.
References


