

DEVELOPMENTAL MATHEMATICS EDUCATION POLICIES AT KANSAS'S
COMMUNITY COLLEGES

by

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DEVELOPMENTAL MATHEMATICS EDUCATION POLICIES AT KANSAS'S COMMUNITY COLLEGES

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This research compared the policies governing developmental mathematics education programs at thirteen community colleges in the state of Kansas with student's success in developmental mathematics courses. Particularly, this study sought to determine what policies had the greatest positive effect on students' success in developmental mathematics courses.

The research design was two-phased. The first consisted of a survey of developmental mathematics education instructional leaders to examine their colleges' policies and collect data on student performance and persistence rates in developmental mathematics courses. Thirteen developmental mathematics education instructional leaders from Kansas's community colleges were surveyed. The community colleges surveyed had student enrollments ranging from 1064 to 7745 students, with 4285 students enrolled in developmental mathematics courses (Kansas Board of Regents, 2002).

The second phase of the study consisted of interviewing three developmental mathematics instructional leaders from three different community colleges with high success rates among their developmental mathematics students. These success rates were derived from analysis of the student performance and persistence data collected in the surveys. Seventy-four percent of the developmental mathematics students enrolled in the fall of 1999 and the spring of 2000 at these three community colleges were successful in their developmental mathematics courses.

The results of the study demonstrated the need for mandatory assessment and placement in developmental mathematics courses. Proper placement through mandatory placement policies and good counseling were vital to student success in developmental mathematics courses. Mandatory placement policies should not be waived.

This study found that policies alone would not guarantee student success in developmental mathematics courses. Two other elements that increased students' success in developmental mathematics courses was the utilization of academic support centers and the developmental mathematics instructors' commitment to developmental mathematics students. The academic support centers, which include tutoring and computerized instruction, were essential components to facilitate student success. Community colleges need to make a commitment to their developmental mathematics students in order to increase students' opportunities for success.

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CHAPTER ONE: INTRODUCTION

Statement of the Problem

Developmental education has been an essential and integral component of the community college mission (Vaughn, 2000; Roueche, Ely, & Roueche, 2001; McCabe & Day, 1998). Developmental education will continue to grow as long as community colleges have an open door admissions policy. Despite the increased research in developmental education there has been little research on the effectiveness of developmental education policies (Kirst, 1998; Weissman, Silk, & Bulakowski, 1997). Community colleges have a responsibility to institute policies that are designed to increase student success. It is critical that these policies be evaluated to determine if they are facilitating student learning.

Community colleges in the state of Kansas have been individually implementing policies governing developmental mathematics education. Administrators, educators, legislators, Boards of Trustees, and the Board of Regents in Kansas are requesting information to determine if these policies are resulting in more effective programs. This study was conducted to determine which developmental mathematics education policies impact the performance and persistence rates of students. This study addressed important issues about the implementation of developmental mathematics policies and will provide a foundation for policy makers of developmental mathematics education.

Purpose of the Study

This research compared the policies governing developmental mathematics education programs at community colleges in the state of Kansas with students' success in developmental mathematics courses. This research was two-phased. The first was to survey developmental mathematics education instructional leaders to examine their colleges' policies, and collect data on student performance and persistence rates in developmental mathematics courses. The second phase was to interview three developmental mathematics education instructional leaders from programs with a high success rate among their developmental mathematics students. The success rates were derived from the student performance and persistence data collected in the surveys.

Eighteen community colleges in the state of Kansas were selected as sites for conducting the research. The participants were the developmental mathematics education instructional leaders identified by the Chief Academic Officer at each community college.

Four components contributed to the making of the research. First, a literature review was completed. The second component was completion of a two-phase design. In the first phase, a descriptive survey was sent to developmental mathematics education instructional leaders to ascertain respective community college's policies, collected data on the number of students enrolled in developmental mathematics courses, and determined student's performance and persistence rates in these courses. Data collected in the first phase was analyzed; these results were used to plan for the second phase, which consisted of qualitative case studies of selected developmental education instructional leaders who were leading their college's successful efforts.

The third component was analysis of the data collected from the two-phase design. The last component was a discussion of the results and recommendations for community college developmental mathematics education instructional leaders.

Research Questions

Phase One: Survey

1. What are the policies being implemented governing developmental mathematics courses at Kansas's community colleges?
2. What are the student performance and persistence rates in developmental mathematics courses at Kansas's community colleges?

Phase Two: Case Studies

1. What policies do developmental education instructional leaders see as effective for students' success in developmental mathematics courses?

Definitions

Developmental Education

Developmental education is a term widely used among educators to describe instruction that prepares students for college level work. Correcting the academic deficiencies of students is just one facet of developmental education. Developmental

education is concerned with the total personal development of students, including mastering learning strategies and developing self confidence (McCabe & Day, 1998). Tutoring, advising, counseling, and diagnostic sessions are all integral parts of developmental education (Boylan, Bonham, & White, 1999; Kull, 2000). An article in the Chronicle of Higher Education defined developmental education as providing the skills students' have not been previously taught with the inclusion of support services (cited in Shaw, 1997).

The National Center for Developmental Education defined developmental education to encompass any program, course, or activity for students that lack necessary skills to do college level work (Payne & Lyman, 1996). A comprehensive approach to defining developmental education is taken by The National Association of Developmental Education (NADE). The NADE defines developmental education as the field of research and practice based on the theoretical foundation in developmental psychology and learning theory, which promotes both cognitive and affective growth (cited in Casazza, 1999). Developmental mathematics education, a large part of developmental education, is defined by the National Council of Teachers of Mathematics (NCTM) as the high school mathematics skills students are academically deficient in as outlined by the NCTM Standards (cited in Kull, 1999).

Remedial Education

Remedial education has a negative connotation; to be remedial is to be substandard or inadequate, therefore is not frequently used by educators. Remedial education re-teaches skills that students should have learned in their earlier education (Roueche & Roueche, 1999; Shaw, 1997). An article in the Chronicle of Higher Education depicts remedial education as the re-teaching of skills students were exposed to but did not learn (cited in Shaw). The National Center for Education Statistics (NCES) Report on Remedial Education characterizes remedial education as the skills necessary to do college level work (National Center for Education Statistics [NCES], 1996). Remedial education courses generally are considered to be pre-college level (Boylan et al., 1999).

In the 1970's remedial education was narrowly characterized as the college courses students took to bring their academic skills up to the college level. This notion of remedial education was deemed to simplistic and did not work with the diverse group of academically under-prepared students that community colleges were serving (Roueche & Roueche, 1993). Because remedial education no longer adequately described the types of courses being taught, educators began using the term developmental education to describe their courses (Roueche & Roueche).

Academically Under-Prepared Students

Developmental and remedial education is designed to meet the needs of academically under-prepared students. Academically under-prepared students lack the basic skills proficiencies in reading, writing, and/or mathematics to enable them to be successful in college level courses (Morante, 1989). The term under-prepared is used when defining both remedial and developmental education students that are skill deficient.

Open Door admissions

The open door admissions policy is unique to community colleges. It was established with the belief education is necessary, will improve society, and equalize the educational opportunities for all people (Roueche, 1968). Open door admissions at the community college in the 1960's meant students were allowed to try anything, even if they were under-prepared. They had the "right to fail" (McCabe, 2000). Initially, open door admissions allowed students to enroll in college level courses regardless of their skill level (Hadden, 2000). In the 1970's community colleges began to adjust their open door admissions policies giving students' access to instruction, but not necessarily the option to enroll in any program (McCabe; Roueche & Roueche, 1999). The courses students' may chose from might be limited by the academic skills they possess.

Mandatory Assessment

A mandatory assessment program requires students to take a test to determine specific academic competencies and deficiencies prior to enrollment in college level courses (McCabe, 2000). Students usually were required to take a test prior to enrollment. The ASSET, COMPASS, ACT, and SAT tests were widely used by

community colleges to determine students' deficiencies in mathematics (Roueche, Ely, & Roueche, 2001).

Mandatory Placement

Mandatory placement requires students who demonstrate deficiencies as a result of assessment to enroll in developmental courses at the level the assessment tool prescribes (Boylan, Bliss, & Bonham, 1997). Mandatory placement sometimes required enrollment in the developmental courses upon initial enrollment at the community college. Most community colleges required students to have all prerequisites completed prior to enrollment in specific college level courses (Berger, 1997). Even though placement was mandatory students usually have the right to sign a waiver and skip developmental courses (Hadden, 2000).

Delimitations

This study confined itself to surveying and interviewing developmental mathematics education instructional leaders at 13 Kansas community colleges. The data collected in the survey included students enrolled in developmental mathematics courses from the fall of 1999 to the fall of 2000.

Limitations

The qualitative findings in the second phase of this study could be subject to other interpretations.

Significance of the Study

Developmental mathematics education has been a part of the community college mission and will continue to be an essential and growing component as long as community colleges continue to pursue an open door admissions policy (Vaughn, 2000; Roueche et al., 2001; McCabe & Day, 1998; Kirst, 1998; Weissman, Bulakowski, et al., 1997). The National Center for Education Statistics Report (NCES) on Remedial Education found 66% of public two-year colleges offered developmental mathematics courses (NCES, 1996). Thirty-four percent of freshman at public two-year colleges enrolled in a developmental mathematics course, with sixty-six percent of these students passing or successfully completing their developmental mathematics courses (NCES).

With the large enrollment in developmental mathematics courses community colleges have a responsibility to institute policies that are designed to increase student success in these courses (Weissman, Bulakowski, & Jumisko, 1997; Vaughn, 2000). These policies should be based on research, create a balance between access, maintain high academic standards, and be evaluated to determine if they are facilitating student learning (Weissman, Bulakowski, et al.; McCabe, 2000).

Despite the increased research in developmental education there is little research on the effectiveness of developmental mathematics education policies. Weissman, Bulakowski, and Jumisko (1997) summarized the need to study the issue.

Evaluation of a developmental education program is critical because it will reveal if the program is accomplishing its purpose, if the students are succeeding, and if the policies the institution has put in place are facilitating student success. It should also examine the policies the college has established to govern the developmental education program, including placement, the timing of remediation, and enrollment in college-level courses. Decision making about the effectiveness of a program and the policies governing the program should be grounded in research (p. 74).

Research must focus on policies, including placement in developmental courses based on assessed achievement (Kirst, 1998). Research on mandatory assessment and placement is needed to determine if developmental mathematics education policies make a difference in student persistence and performance (Education Commission of the States, 2000; League for Innovation in the Community College, 2001; Roueche & Roueche, 1993; Roueche & Roueche, 1999).

This study was conducted to determine which developmental mathematics education policies impact the performance and persistence rates of developmental students. It addressed important issues about the implementation of developmental mathematics policies and provided a foundation for developmental mathematics education policy makers. This study has significance to the administration, department chairs, developmental education instructional leaders, faculty, staff, and students at community colleges in Kansas, because it will contribute to a broader understanding of

developmental mathematics education policies at community colleges in the state of Kansas.

Administrators, department chairs, and developmental education instructional leaders will benefit from the knowledge gained about developmental mathematics education policies. The knowledge will be used to develop and implement policies that give students the greatest opportunity for success. This study will give faculty and staff insight into developmental mathematics education policies. They will benefit from the creation of policies that increase student success. The third group, students, reaps the rewards of developmental mathematics education policies that improve student performance and persistence.

This study will contribute to the scholarly research on developmental mathematics education. The major impact of this study will be on the development and implementation of developmental mathematics education policies that improve student performance and persistence.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This chapter discusses the current literature on developmental education. This chapter is divided up into several sections. Beginning with a comparison of the terms developmental and remedial education, a discussion of the open door admissions concept, and an overview of the research on mandatory assessment and mandatory placement. Included is a synopsis of the successful developmental education program at the community college of Denver and current developmental education policies at public two-year colleges. The chapter concludes with an overview of the current research on performance and persistence rates of developmental education students and developmental mathematics students.

According to Hunter Boylan, developmental is not a euphemism for remediation, which describes only one option of several possible interventions (Boylan, 1995). There is an ongoing debate as to which term, developmental or remedial, should be used to describe the educational process of under-prepared students. Researchers have attempted to separate the terms identifying remedial education as strengthening basic skills for a specific program, and developmental education as developing a broader range of skills not particularly for a specific program (Roueche & Roueche, 1993).

Most researchers use the terms developmental and remedial interchangeably. Developmental education is an “ameliorative designation” (Payne & Lyman, 1996). The term developmental education achieved longevity when the editors renamed the Journal of Remedial and Developmental Education to the Journal of Developmental Education in 1976 (Payne & Lyman). In the Kansas Board of Regents proposed policy on developmental education the word remedial had been removed; for the purpose of this research I will be using the term developmental education (Kansas Board of Regents, 2001).

Open Door Admissions - Equal Access

The community colleges mission is to serve all segments of society through an open door admissions policy (Roueche, Ely, & Roueche, 2001; Vaughn, 2000). The open door admission policy appeals to a broad audience, encourages lifelong learning, betters

society, and is required in our global economy (Roueche et al.). Without this access to education, society will lose the opportunity to raise the educational level of the most disadvantaged members of our society (Community College Research Center, 1999).

Open door admissions policies have been criticized as being a compromise to excellence and high academic standards (Roueche et al., 2001). Critics say open door admissions give high school students a false impression about what is expected to be learned in high school; community colleges become "second chance" institutions (Community College Research Center, 1999; Coley, 2000). Open door admissions policies are being threatened by increased demands for accountability, which might limit opportunity for students (Roueche et al.).

An open door admission policy gives access to education, but not necessarily the option to enroll in any program (Roueche & Roueche, 1999). Developmental education provides an avenue to obtain the required prerequisite skills necessary to have a reasonable chance to be successful in college courses (Vaughan, 2000). Developmental education facilitates access, equal opportunity, and assimilation into higher education (Mills, 1998). "Access and developmental education are inseparable" (McCabe, 2001). Developmental education makes it possible to admit a substantial number of students who would not likely enter college or be successful at the college level (Mills). Developmental education is a vital component of open door admission (Weissman, Bulakowski, et al., 1997).

Mandatory Assessment

The statements "right to fail" and "freedom to choose" were prevalent in higher education (McCabe, 2000). Students made decisions about their education without the knowledge of their strengths and weaknesses. Having this knowledge enables students to make educated decisions about what courses to take (Morante, 1989). In order to obtain this knowledge, assessment upon entry into the community college must be mandatory (Morante). If assessment is voluntary, many students, especially those students in need, will avoid assessment (Morante).

In a national study of developmental education at 160 colleges and universities conducted by the Exxon Education Foundation (1988-1994), 76% required entry level

testing (cited in Boylan, Bliss, & Bonham, 1997). There was no significant difference in overall GPA or in retention of these students (Boylan et al.). However mandatory assessment related to future success in developmental courses (Boylan et al.).

A study conducted by Robert H. McCabe of 1520 people, from 25 community colleges who began their developmental education, found that mandatory assessment was an essential component to identify which students were under-prepared (McCabe, 2000). In the 1970's Miami-Dade community college was in the forefront of the academic movement to implement mandatory assessment (McCabe). McCabe recommended that the assessment programs go beyond identifying who is deficient and become a diagnostic assessment.

The American Association of Community Colleges study of community college policies, found that 58% of community colleges required assessment of all students (American Association of Community Colleges [AACC], 2000). Seventy-six percent of these community colleges requiring assessment exempt students if they had appropriate college entrance exam scores (AACC). These mandatory assessment policies were established at the institutional level at 65% of the community colleges with 33% being state mandated (AACC). Seventy-seven percent of the community colleges set the cut-off scores for their tests, 33% were state mandated (AACC).

According to the National Center for Education Statistics Report (NCES) report, placement tests in mathematics were mandatory at 70% of two-year colleges, with 21% only testing those students that met testing criteria (NCES). In a national study of developmental education conducted by the Exxon Education Foundation (1988-1994) students were more likely to pass future mathematics courses at colleges where testing was mandatory, than those students from colleges where testing was voluntary (cited in Boylan et al., 1997).

Byron McClenney, former president of the Community College of Denver, stated during his presentation at the Learning Excellence and Academic Development (LEAD) conference, "failing to do entry level assessment will impede progress, we should care about assessing everyone at point of entry" (McClenney B., 2001). Kay McClenney stated at the LEAD conference, "assessment helps people learn, students and us"

(McClenney, K., 2001). Developmental education is most effective when assessment is mandatory (Morante, 1989; Roueche & Roueche, 1999).

Mandatory Placement

The American Association of Community Colleges study of community college policies found 75% of the community colleges that required assessment also required placement in developmental courses (AACC, 2000). Mandatory assessment and placement are vital to academic success. "Colleges in states that require assessment and placement report that student retention and success levels improve when mandatory assessment and placement policies are enforced" (Roueche & Roueche, 1999, p. 47). There must be a linkage between assessment and placement to ensure identification and enrollment of under-prepared students in developmental courses (Morante, 1989; Roueche & Roueche). According to McMillan, Parke, and Lanning (1997), and Roueche, Baker, and Roueche (1984), a high correlation of success has been found in a number of studies between mandatory assessment and placement.

Mandatory placement increases the odds of academic success. Students must know their options, the risks, and consequences of their choices in order to make good enrollment decisions.

Students don't need the "right to fail" and they need the right to succeed.

It does not make sense to let them go into programs they are not prepared for. They are either going to fail or faculty will bring down the standards (McCabe, 2001).

Mandatory placement allows instructors to maintain the academic standards and rigor in their college level courses without feeling they are leaving students behind (Hadden, 2000).

A national study by the Exxon Education Foundation (1988-1994) found mandatory placement was required at 35% of two-year colleges (Boylan et al., 1997). Mandatory placement was related to success in developmental courses but negatively related to retention at two-year colleges (Boylan et al.). Retention may be lower when students are required to take developmental courses; these students may not be as motivated as those students who volunteered to take the developmental courses.

Mandatory placement will also increase the number of weak students enrolled in developmental courses and this large number may drive down retention (Boylan et al.). Community colleges have widely reported that significant numbers of under-prepared students do not enroll in developmental courses unless required to enroll in those courses (Boylan et al.; McCabe, 2000).

Robert H. McCabe's study of developmental education in 1990 found that mandatory placement was an essential component to attain student success (McCabe, 2000). "It is unfair to let them enroll in courses they are not prepared for" (McCabe, 2001). McCabe recommends community colleges utilize the substantial amount of research validating mandatory placement into developmental education courses (McCabe, 2000). The NADE suggests it is a waste of tax dollars to allow students to bypass the developmental courses (cited in Hadden, 2000). "If mandatory placement convinces students not to enroll, how motivated were they?" (Hadden, 2000, p. 834).

A 1997 study at the College of Lake County, a community college in Chicago, supported mandatory placement. They tracked 239 under-prepared students that chose remediation, and 179 under-prepared students that did not remediate, from the fall of 1992 to the fall of 1994 (Weissman, Bulakowski, et al., 1997). The GPA of these two groups was significantly different for their college level courses. The group that chose remediation had a GPA of 2.17; compared to 1.52 for the under-prepared group of students that chose not to remediate (Weissman et al.). The retention rates of the remediated students (45%) was similar to college ready students (33%), the group that chose not to remediate had much lower retention rates (7%) (Weissman, Silk, & Bulakowski, 1997).

There have been many studies on the effectiveness of developmental education with little research on the effectiveness of policies (Weissman, Silk, et al., 1997). The research agenda at the first National Conference of Research in Developmental Education was to find out if mandatory placement had an impact on student success (Weissman et al.). Further research has been recommended on mandatory assessment and placement to determine if these policies make a difference in student persistence and performance

(Education Commission of the States, 2000; League for Innovation in the Community College, 2001; Roueche & Roueche, 1993; Roueche & Roueche, 1999).

Community College of Denver

Developmental education is an integral part of the mission of the Community College of Denver (McCabe & Day, 1998). The Community College of Denver is the third largest community college in Colorado serving over 10,000 students, primarily from the poor inner city neighborhoods (Roueche et al., 2001). One-third of the credit hours generated at the Community College of Denver are in developmental education (Roueche et al.).

Developmental education is a critical entity that serves the entire institution (Roueche et al., 2001). Upon entry, students at the Community College of Denver are required to take a basic skill assessment (McCabe & Day, 1998). Students meet with an advisor to review assessment results, along with their academic and personal background, to determine which courses they are academically prepared for (McCabe & Day). Placement in developmental courses is not mandatory, although students are expected to develop basic skills until they reach college level competency (McCabe & Day). Students must complete all prerequisites before enrolling in higher level courses (McCabe & Day).

The academic support center at the Community College of Denver was an important component of the developmental education program (Roueche et al., 2001). The center bridged the gap between academia and support services, using the "high tech-high touch" approach, from tutoring to computer assisted instruction (McCabe & Day, 1998). These interventions have led to a successful developmental education program at the Community College of Denver. For the first time, in 1995, students that started their education in developmental courses were as likely to graduate as the students that did not begin in developmental courses (Roueche et al.). Completion of the developmental education program became a predictor of success after graduation and/or transferring in 1998 (Roueche et al.).

Byron McClenney, the president of the Community College of Denver from 1986 to the summer of 2000, lead the drive to create a "level playing field" for all students