



A description, comparison, and contrast of postsecondary developmental mathematics programs in North Dakota
by Laurie Kay Geller

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education in Education
Montana State University
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Abstract:

Postsecondary developmental education is prevalent in higher education. In North Dakota and the rest of the nation, mathematics required remediation more often than any other subject. The literature has identified practices that contribute to successful developmental education, but it was not known if postsecondary developmental educators used these practices.

In response to the above issues, this study did three things: (1) described developmental mathematics education at six of the eleven public postsecondary institutions in North Dakota; (2) compared each institution's policies; organizational and instructional characteristics to "best practice" in developmental education; and (3) contrasted the practices of the programs across institutional types. Data were collected from interviews with instructors and directors of the developmental mathematics programs, observations of developmental mathematics classes, developmental mathematics grade distribution data, and course syllabi.

Findings from the study include the use of mandatory assessment at all institutions but a lack of mandatory placement except at one institution. None of the programs had clearly defined and stated program goals, but most course syllabi included course goals or objectives. None of the programs were regularly and systematically assessed and evaluated. Developmental mathematics instructors were usually adjuncts or lecturers with bachelor's or master's degrees. They had few faculty development opportunities, and some were not included in their department's planning and decision-making activities. All programs used some form of technology but to differing degrees, and most programs intended to align developmental math courses with future courses. Tutoring was the main support service available to students, except at one institution.

This institution had a successful cohort program for underprepared students that included Supplemental Instruction.

As a result of the study, suggestions and recommendations were made for developmental mathematics programs, academic leaders, researchers, and further research.

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DEVELOPMENTAL MATHEMATICS PROGRAMS IN NORTH DAKOTA

by

Laurie Kay Geller

A dissertation submitted in partial fulfillment
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Laurie Kay Geller

This dissertation has been read by each member of the dissertation committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

Dr. Richard Howard

Richard Howard 07/21/03
(Signature) Date

Approved for the Department of Education

Dr. Robert Carson

Robert Carson 7-21-03
(Signature) Date

Approved for the College of Graduate Studies

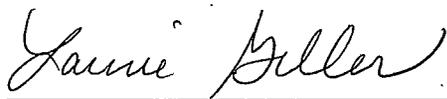
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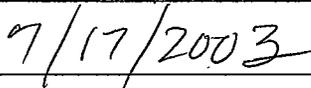
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This work is dedicated to my grandmothers, Mary Clifford and Maxine Randolph, two strong, talented, and beautiful women.

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TABLE OF CONTENTS

| | |
|---|----|
| 1. INTRODUCTION TO THE STUDY | 1 |
| Chapter Introduction | 1 |
| Statement of the Problem | 3 |
| Purpose of the Study..... | 4 |
| Significance of the Study..... | 4 |
| Research Questions | 8 |
| Definition of Terms | 9 |
| Assumptions, Limitations, and Delimitations of the Study..... | 10 |
| Assumptions..... | 10 |
| Limitations and Delimitations..... | 11 |
| Organization of the Remainder of the Study..... | 12 |
| 2. LITERATURE REVIEW..... | 14 |
| Chapter Introduction | 14 |
| Criteria for Selecting the Literature | 14 |
| Context of the Problem | 17 |
| Remedial Education Versus Developmental Education..... | 18 |
| History of Developmental Education..... | 21 |
| The Developmental Student..... | 26 |
| Classifications of the Developmental Student | 26 |
| Demographics of Developmental Students..... | 29 |
| Cost of Developmental Education | 36 |
| Critics of Developmental Education | 39 |
| High Cost of Developmental Education | 40 |
| High Schools Are Not Doing Their Job | 42 |
| Four-Year Institutions Should Not Provide Developmental Education..... | 44 |
| Developmental Education Lowers Academic Standards..... | 45 |
| Carnegie Classification of Institutions of Higher Education..... | 47 |
| Theme Development | 49 |
| The Need for Developmental Education | 50 |
| The Performance of Developmental Students | 56 |
| Laws and Limits Affecting Developmental Education | 60 |
| Policies in Developmental Education..... | 61 |
| Mandatory Assessment and Placement | 62 |
| Credit and Financial Aid for Developmental Courses | 65 |
| Institutional Commitment to Developmental Education..... | 66 |
| Other Policies..... | 68 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|-----|
| Organization of Developmental Education | 69 |
| Developmental Faculty and Staff..... | 71 |
| Learning Theory..... | 76 |
| Strategic Learning | 77 |
| Critical Thinking | 78 |
| Metacognition | 79 |
| Other Theories and Research | 80 |
| Developmental Instruction and Curriculum | 81 |
| Mastery Learning | 82 |
| Learning Communities and Paired Courses..... | 83 |
| Lab Integration..... | 84 |
| Technology..... | 85 |
| Diversity of Instructional Methods..... | 87 |
| Degree of Structure..... | 89 |
| Constructivism | 89 |
| Seamless Alignment of Courses..... | 91 |
| Written Statement of Program Goals and Objectives..... | 92 |
| Other Instructional Methods | 93 |
| Developmental Support Services | 94 |
| Orientation and Freshman Seminar | 94 |
| Counseling | 95 |
| Tutoring | 96 |
| Supplemental Instruction | 98 |
| Assessment and Evaluation of Developmental Programs | 100 |
| Comprehensiveness | 103 |
| Summary of “Best Practices” in Developmental Education..... | 104 |
| Reducing and Improving Developmental Education | 106 |
| Reducing Developmental Education | 106 |
| Improving Developmental Education..... | 109 |
| Organizations Supporting Developmental Education | 110 |
| National Center for Developmental Education..... | 110 |
| National Association for Developmental Education | 111 |
| American Mathematical Association of Two-Year Colleges | 113 |
| Review of Methodologies..... | 117 |
| Evaluation of the Literature..... | 119 |
| Summary of the Review of the Literature | 119 |
| Weaknesses and Strengths in the Literature | 122 |
| Gaps and Saturation Points in the Literature | 123 |
| Avenues for Further Inquiry | 125 |
| Chapter Summary | 127 |

TABLE OF CONTENTS – CONTINUED

| | |
|---|-----|
| 3. RESEARCH METHODOLOGY..... | 130 |
| Chapter Introduction..... | 130 |
| Programs and Participants..... | 131 |
| Programs and Participants..... | 131 |
| Method of Selection of Programs and Participants..... | 132 |
| Demographic Characteristics of the Institutions..... | 133 |
| Institutions A-E..... | 135 |
| Institutions F-H..... | 137 |
| Institution I..... | 138 |
| Institutions J and K..... | 139 |
| Developmental Mathematics Programs..... | 140 |
| Developmental Mathematics Courses..... | 143 |
| Common Course Numbering..... | 144 |
| Instrumentation..... | 146 |
| Grade Distribution Report..... | 146 |
| “Best Practices” Checklist..... | 147 |
| General Syllabus Checklist..... | 151 |
| Interview Protocols..... | 155 |
| Director Protocol..... | 155 |
| Instructor Protocol..... | 158 |
| Research Design..... | 160 |
| Rationale..... | 160 |
| Grade Distribution Data..... | 160 |
| Course Syllabi..... | 161 |
| Classroom Observations..... | 161 |
| Interviews..... | 162 |
| Data Collection Processes..... | 162 |
| Grade Distribution Data..... | 163 |
| Course Syllabi..... | 163 |
| Classroom Observations and Interviews..... | 164 |
| Data Analysis..... | 165 |
| Grade Distribution Data..... | 165 |
| Course Syllabi..... | 166 |
| Classroom Observations and Interviews..... | 167 |
| Descriptions..... | 167 |
| Comparisons to “Best Practice”..... | 168 |
| Contrasts Across Institutional Types..... | 169 |
| Validity and Reliability in the Study..... | 169 |
| Grade Distribution Data..... | 169 |
| Course Syllabi..... | 170 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|---------|
| Classroom Observations and Interviews..... | 170 |
| Trustworthiness..... | 171 |
| Limitations and Delimitations..... | 172 |
| Limitations..... | 172 |
| Delimitations..... | 173 |
| Timeframe for the Study..... | 174 |
| Chapter Summary..... | 175 |
| 4. RESEARCH FINDINGS..... | 176 |
| Chapter Introduction..... | 176 |
| Summary of the Data..... | 177 |
| Introduction..... | 177 |
| Program Descriptions..... | 179 |
| AA I..... | 186 |
| AA II..... | 186 |
| BA I..... | 188 |
| BA II..... | 188 |
| Master's Institution..... | 189 |
| Doctoral Institution..... | 190 |
| Data Analysis..... | 191 |
| Comparisons to "Best Practice": Introduction..... | 191 |
| "Best Practice": AA I..... | 191 |
| Mandatory Assessment and Placement..... | 191 |
| Strong Institutional Commitment..... | 193 |
| Centralized or Highly Coordinated Developmental Program..... | 195 |
| Developmental Mathematics Faculty..... | 196 |
| Mastery Learning..... | 197 |
| Classroom and Lab Integration..... | 198 |
| Supplemental Use of Technology..... | 198 |
| Variety of Instructional Methods..... | 198 |
| Course Structure..... | 201 |
| Intent to Align Courses..... | 202 |
| Statement of Goals, Objectives, or Desired Outcomes..... | 203 |
| Support Services..... | 203 |
| Assessment..... | 204 |
| Comprehensiveness..... | 205 |
| "Best Practice": AA II..... | 205 |
| Mandatory Assessment and Placement..... | 205 |
| Strong Institutional Commitment..... | 206 |
| Centralized or Highly Coordinated Developmental Program..... | 208 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|-----|
| Developmental Mathematics Faculty | 209 |
| Mastery Learning | 211 |
| Classroom and Lab Integration | 211 |
| Supplemental Use of Technology | 212 |
| Variety of Instructional Methods | 212 |
| Course Structure..... | 215 |
| Intent to Align Courses..... | 216 |
| Statement of Goals, Objectives, or Desired Outcomes | 216 |
| Support Services..... | 217 |
| Assessment..... | 218 |
| Comprehensiveness | 219 |
| “Best Practice”: BA I | 220 |
| Mandatory Assessment and Placement | 220 |
| Strong Institutional Commitment..... | 220 |
| Centralized or Highly Coordinated Developmental Program..... | 222 |
| Developmental Mathematics Faculty | 223 |
| Mastery Learning | 223 |
| Learning Communities or Paired Courses..... | 223 |
| Supplemental Use of Technology | 224 |
| Variety of Instructional Methods | 224 |
| Course Structure..... | 226 |
| Intent to Align Courses..... | 227 |
| Statement of Goals, Objectives, or Desired Outcomes | 227 |
| Support Services..... | 228 |
| Assessment..... | 229 |
| Comprehensiveness | 229 |
| “Best Practice”: BA II | 230 |
| Mandatory Assessment and Placement | 230 |
| Strong Institutional Commitment..... | 230 |
| Centralized or Highly Coordinated Developmental Program..... | 231 |
| Developmental Mathematics Faculty | 233 |
| Supplemental Use of Technology | 234 |
| Variety of Instructional Methods | 234 |
| Course Structure..... | 235 |
| Intent to Align Courses..... | 236 |
| Statement of Goals, Objectives, or Desired Outcomes | 236 |
| Support Services..... | 237 |
| Assessment..... | 237 |
| Comprehensiveness | 237 |
| “Best Practice”: Master’s Institution..... | 238 |
| Mandatory Assessment and Placement | 238 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|-----|
| Strong Institutional Commitment..... | 239 |
| Centralized or Highly Coordinated Developmental Program..... | 241 |
| Developmental Mathematics Faculty | 242 |
| Mastery Learning | 244 |
| Supplemental Use of Technology | 245 |
| Variety of Instructional Methods | 246 |
| Course Structure..... | 251 |
| Intent to Align Courses..... | 252 |
| Statement of Goals, Objectives, or Desired Outcomes | 252 |
| Support Services..... | 253 |
| Assessment..... | 254 |
| Comprehensiveness | 255 |
| “Best Practice”: Doctoral Institution..... | 256 |
| Mandatory Assessment and Placement | 256 |
| Strong Institutional Commitment..... | 257 |
| Centralized or Highly Coordinated Developmental Program..... | 261 |
| Developmental Mathematics Faculty | 262 |
| Mastery Learning | 265 |
| Classroom and Lab Integration | 265 |
| Supplemental Use of Technology | 265 |
| Variety of Instructional Methods | 266 |
| Course Structure..... | 271 |
| Intent to Align Courses..... | 273 |
| Statement of Goals, Objectives, or Desired Outcomes | 274 |
| Support Services..... | 274 |
| Assessment..... | 277 |
| Comprehensiveness | 278 |
| Program Contrasts | 279 |
| Course Offerings | 279 |
| Coordination and Centralization | 280 |
| Developmental Mathematics Faculty | 282 |
| Policies..... | 282 |
| Goals, Objectives, and Desired Outcomes..... | 283 |
| Instruction | 284 |
| Support Services..... | 284 |
| Institutional Support | 285 |
| Grade Distribution Data..... | 285 |
| “Best Practice” and Comprehensiveness | 286 |
| Summary | 288 |
| Discussion of the Meaning | 289 |
| Relationship to Prior Research..... | 289 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|------------|
| Remedial Education Versus Developmental Education | 289 |
| The Developmental Student..... | 290 |
| Cost and Critics of Developmental Education | 290 |
| The Performance of Developmental Students..... | 291 |
| Policies of Developmental Education..... | 293 |
| Organization of Developmental Education..... | 294 |
| Developmental Faculty and Staff..... | 295 |
| Developmental Instruction and Curriculum..... | 296 |
| Developmental Support Services | 300 |
| Assessment and Evaluation of Developmental Programs | 301 |
| Comprehensiveness | 302 |
| Reducing and Improving Developmental Education | 303 |
| Findings Not Supported and Supported by the Literature..... | 304 |
| Findings Not Supported by the Literature | 304 |
| Findings Supported by the Literature | 306 |
| Weaknesses, Uncontrolled Factors, and Incongruities in the Study | 308 |
| Chapter Summary | 310 |
| 5. CONCLUSIONS..... | 315 |
| Chapter Introduction | 315 |
| Summary of the Findings | 318 |
| Course Offerings | 318 |
| Mandatory Assessment and Placement | 319 |
| Strong Institutional Commitment..... | 319 |
| Coordination and Centralization | 320 |
| Developmental Mathematics Faculty | 321 |
| Instruction and Curriculum..... | 321 |
| Support Services..... | 325 |
| Assessment and Evaluation | 326 |
| Comprehensiveness | 326 |
| Grade Distribution Data..... | 327 |
| Suggestions | 328 |
| Suggestions for Developmental Mathematics Programs..... | 328 |
| Suggestions for Researchers | 331 |
| Suggestions for Further Research | 331 |
| Implications | 332 |
| Assessment and Placement Polices | 332 |
| Centralization and Coordination | 332 |
| Instructors and Instruction..... | 333 |
| Support Services..... | 333 |

TABLE OF CONTENTS – CONTINUED

| | |
|--|-----|
| Goals, Objectives, and Desired Student Outcomes..... | 334 |
| Assessment and Evaluation | 335 |
| Recommendations..... | 335 |
| Recommendations for Academic Leaders..... | 335 |
| Recommendations for Researchers..... | 336 |
| Recommendations for Future Research..... | 337 |
| REFERENCES..... | 339 |
| APPENDICES..... | 354 |
| APPENDIX A: INSTRUMENTS..... | 355 |
| APPENDIX B: PROGRAM DESCRIPTION FOR AA I..... | 364 |
| APPENDIX C: PROGRAM DESCRIPTION FOR AA II..... | 406 |
| APPENDIX D: PROGRAM DESCRIPTION FOR BA I..... | 448 |
| APPENDIX E: PROGRAM DESCRIPTION FOR BA II..... | 468 |
| APPENDIX F: PROGRAM DESCRIPTION FOR MASTER'S INSTITUTION..... | 489 |
| APPENDIX G: PROGRAM DESCRIPTION FOR DOCTORAL INSTITUTION..... | 534 |
| APPENDIX H: GRADE DISTRIBUTION DATA..... | 582 |

LIST OF TABLES

| Table | Page |
|---|------|
| 1. Freshman Developmental Enrollment During Fall 1995, by Subject Area and Institutional Characteristics | 30 |
| 2. Mean Percent of Students Generally Passing or Successfully Completing Developmental Courses, by Subject Area and Institutional Characteristics: 1995 | 31 |
| 3. Demographic Data of Developmental Students..... | 32 |
| 4. Academic Data of Developmental Students | 33 |
| 5. 1994 Carnegie Classification Categories and Definitions | 48 |
| 6. Comparative Retention Rates of Developmental Students..... | 58 |
| 7. "Best Practices" in Developmental Education..... | 105 |
| 8. Institutional Type and Fall 2001 Enrollment..... | 134 |
| 9. Program Types, Number Offered, and Number Completed at Each Institution During 2000-2001 | 135 |
| 10. Fall Semester 2002 Developmental Mathematics Courses by Institutions | 145 |
| 11. Timeframe for the Study..... | 174 |
| 12. AA I: Program Description..... | 180 |
| 13. AA II: Program Description | 181 |
| 14. BA I: Program Description..... | 182 |
| 15. BA II: Program Description..... | 183 |
| 16. Master's Institution: Program Description | 184 |
| 17. Doctoral Institution: Program Description | 185 |

LIST OF TABLES – CONTINUED

| | |
|---|-----|
| 18. “Best Practices” Used for Comparison Analysis | 192 |
| 19. Use of “Best Practice” by Each Institution..... | 287 |
| 20. “Best Practices” in Developmental Education..... | 317 |
| 21. Drop Rates and Success Rates by Course and Institution for Fall 1999, Fall 2000, and Fall 2001 Combined..... | 327 |

ABSTRACT

Postsecondary developmental education is prevalent in higher education. In North Dakota and the rest of the nation, mathematics required remediation more often than any other subject. The literature has identified practices that contribute to successful developmental education, but it was not known if postsecondary developmental educators used these practices.

In response to the above issues, this study did three things: (1) described developmental mathematics education at six of the eleven public postsecondary institutions in North Dakota; (2) compared each institution's policies, organizational and instructional characteristics to "best practice" in developmental education; and (3) contrasted the practices of the programs across institutional types. Data were collected from interviews with instructors and directors of the developmental mathematics programs, observations of developmental mathematics classes, developmental mathematics grade distribution data, and course syllabi.

Findings from the study include the use of mandatory assessment at all institutions but a lack of mandatory placement except at one institution. None of the programs had clearly defined and stated program goals, but most course syllabi included course goals or objectives. None of the programs were regularly and systematically assessed and evaluated. Developmental mathematics instructors were usually adjuncts or lecturers with bachelor's or master's degrees. They had few faculty development opportunities, and some were not included in their department's planning and decision-making activities. All programs used some form of technology but to differing degrees, and most programs intended to align developmental math courses with future courses. Tutoring was the main support service available to students, except at one institution. This institution had a successful cohort program for underprepared students that included Supplemental Instruction.

As a result of the study, suggestions and recommendations were made for developmental mathematics programs, academic leaders, researchers, and further research.

INTRODUCTION TO THE STUDY

Chapter Introduction

“If you think the cost of education is high--try ignorance” (Bok, 1979, p. 28). The actual cost of effective remedial education is small compared with the cost of maintaining a society with large numbers of uneducated, unemployed, unemployable, and discontented citizens. Remedial programs can alleviate these ills and offer opportunities for citizens to become taxpayers, workers, and—ultimately—consumers. Critics of remedial programs need data to compare the cost of education and training with the actual cost of alternatives--for example, inmate incarceration. (Roueche & Roueche, 1999b, p. 15)

There was a widespread need for developmental education at colleges and universities across the country. According to the National Center for Education Statistics (1996), 78% of higher education institutions that enrolled freshmen in 1995 offered developmental courses in reading, writing, or mathematics. Adelman (1999) found that 46% of all postsecondary students who earned more than 10 credits took at least one remedial course in English, pre-collegiate math, or basic study skills. Boylan (1999b) estimated that approximately 2.5 million of the nation's almost 13 million undergraduates participated in developmental education during any given year. This estimate was nearly 20% of all undergraduates. The National Center for Education Statistics (1996) found that in 1995, 29% of the nation's 2.1 million first-time freshmen enrolled in at least one developmental reading, writing, or mathematics course. Unlike Boylan's (1999b) estimate, the study by the National Center for Education Statistics did not include: (1) developmental courses in other subjects, (2) developmental services outside of courses, (3) spring developmental enrollments, and (4) non-freshmen participating in

developmental education. In addition, it only reported the percentage of first-year students *enrolled* in developmental education in 1995, not the percentage of students who actually *needed* to take developmental courses. The large numbers of students participating in developmental education raised concerns about its cost.

In 1998, Breneman and Haarlow estimated the annual cost of developmental education to be approximately \$1 billion of the \$115 billion public higher education budget. This estimate did not include the costs at private institutions or other costs to society and the economy. Merisotis and Phipps (2000) estimated that the figure was probably closer to \$2 billion. Saxon and Boylan (1999) said, "Remedial courses seldom cost institutions more than they received in revenues...[and] typically generate more revenue than is spent in their delivery" (para. 36). Others (Astin, 1998; Boylan, Bonham, & White, 1999; Ghazi & Irani, 1997; Institute for Higher Education Policy, 1998; McCabe, 2000a, 2000b; Merisotis & Phipps, 2000; Phipps, 1998; Roueche & Roueche, 1999b; The Economic Importance, 2001) argued that what was spent on developmental education was merely an investment in today's society and economy. This investment would pay for itself by decreasing the likelihood of dependency on social programs and increased tax revenue. McCabe (2000a) stated, "Ten students can have the foundation for their future built through remedial education for the same cost as incarcerating one person for a single year" (p. 40).

Adelman (1995) found that the need to take developmental education reduced the probability of attaining a degree, but effective developmental education "equalizes the opportunity for underprepared students to be successful" (Boylan, 1999b, para. 13).

“With appropriate assistance, underprepared students can be just as successful in higher education as their better prepared colleagues” (Boylan, 1999b, para. 16). Boylan and Bonham (1992) found that community college students who were judged to be underprepared and who participated in developmental education were slightly more likely to obtain a degree than the typical community college student. The situation was similar at the universities. Boylan, Bonham, Claxton, and Bliss (1992), Minnesota State Colleges and Universities (1996), and Boylan and Saxon (1998a) found evidence that suggested passing developmental courses was related to higher grades and to increased student retention. Students who passed developmental courses were also more likely to pass their first college level course in the same subject (Boylan, Bonham, Claxton, & Bliss, 1992; Penny & White, 1998).

From the above, developmental education was a concern of higher education and society. The workplace needed highly educated employees to meet the demands of an increasingly technical and global workplace. Developmental education based on “best practice” helped more students successfully take and pass college level courses, be retained longer, and eventually earn a degree. “Providing effective remedial education is not a mysterious proposition. We know how to do it. We simply do not use what we know” (Boylan & Saxon, 1999, para, 54).

Statement of the Problem

The problem addressed in this comparative study was postsecondary developmental education was prevalent in higher education institutions, and it was not

known whether institutions used the techniques, models and structures described in the literature that contributed to successful developmental education.

Purpose of the Study

The purpose of this comparative study was: (a) to describe public postsecondary developmental mathematics education in North Dakota; (b) to compare each institution's policies, organizational and instructional characteristics to "best practice" in developmental education; and (c) to contrast these programs by institutional type using the Carnegie Classification of Institutions of Higher Education (Carnegie Foundation for the Advancement of Teaching, 1994).

Significance of the Study

Postsecondary developmental education was present at the 11 public institutions in North Dakota. During the fall of 2001, these 11 institutions enrolled 37,596 students, including 7,825 new freshmen (Office of Data Collection and Reporting, 2001). During the 1999-2000 academic year, 3,415 students were enrolled in developmental education, as defined at each institution (North Dakota University System [NDUS], 2000). Each institution might have defined developmental education differently. For example, at the four-year institutions, students who took mathematics courses numbered lower than Math 103 College Algebra did not always receive credit toward graduation for these courses. Other students at some of the two-year institutions received credit toward graduation and their degrees for some of these courses. One institution defined a writing lab as developmental education. Other institutions that required students to attend such labs did

not define their labs as developmental education. In addition, some enrollment data were missing. For example, one institution offered the developmental mathematics course, Math 102 Intermediate Algebra, but these data were not included on the report (NDUS, 2000). Thus, the number of postsecondary developmental students in North Dakota might have been higher than what was accounted for in the study.

Developmental mathematics education in North Dakota had the largest enrollments of all subject areas (NDUS, 2000). In fall 1999, 49% of all developmental enrollments were in developmental mathematics courses, and in spring 2000, 62% were enrolled in developmental mathematics courses (NDUS, 2000). The North Dakota University System (NDUS) (2000) further explored one of the developmental mathematics courses. They examined the 182 first time, first year freshmen in Math 100 Elementary Algebra at one of the doctoral institutions in fall 1999. Math 100 was considered a "refresher math" course and did not satisfy any associate's or bachelor's degree requirements at any of the 11 institutions (NDUS, 2000). The NDUS (2000) stated that 150 of the 182 students (82%) met North Dakota's core admission requirements for baccalaureate and graduate campuses (North Dakota State Board of Higher Education, 2001). This included at least three years of mathematics in high school at the level of algebra I and above. Yet these students still placed into a developmental mathematics course. Fifty-nine percent of the 182 students were 18 to 19 years old; thus, they were probably students who had recently graduated from high school. Developmental mathematics was in demand in North Dakota, even by recent graduates who met college preparatory mathematics requirements.

The greatest need for remediation was in mathematics (Boylan & Saxon, 1999; McCabe, 2000a; National Center for Education Statistics, 1996). According to the National Center for Education Statistics (1996), 24% of all 2.1 million entering freshmen enrolled in developmental mathematics courses in 1995, while 13% and 17% enrolled in developmental reading and writing courses, respectively. This percentage was higher than in 1989 when 21% of all entering freshmen enrolled in developmental mathematics courses (National Center for Education Statistics, 1991, 1996). Developmental mathematics courses also had the lowest passing and completion rates of all subjects (Adelman, 1999; Boylan & Bonham, 1992; National Center for Education Statistics, 1991, 1996). In 1989, 67% of students passed developmental mathematics courses while 73% and 77% passed developmental writing and reading courses, respectively (National Center for Education Statistics, 1991). This trend continued in 1995 when 74% passed developmental mathematics courses and 79% and 77% passed developmental writing and reading courses, respectively (National Center for Education Statistics, 1996). These percentages were lower in the public two-year and four-year institutions than in the private two-year and four-year institutions (National Center for Education Statistics, 1991, 1996). Hagedorn, Siadat, Fogel, Nora, and Pascarella (1999) reported Adelman's bleak view of remedial mathematics:

According to Adelman (1995), the mathematical background of many remedial college students is so deficient that a high failure rate exists even in the remedial classes... Moreover, the major proportion of these students become frustrated with curriculums that include no true or transferable college credit and therefore "drop out" of college without earning a degree (or, in many cases, any transferable college credits). (p. 261)

Mathematics was the greatest obstacle for many students (McCabe, 2000a). However it was so important in the changing workplace, economy, and society.

According to testimony by Greenspan (as cited in The Economic Importance, 2001), "We must strengthen math and science education to address the requirements of the newer technologies we see on the horizon" (para. 16). "Currently, 65% of the nation's workers need the skills of a generalist/technician, including advanced reading, writing, mathematical, critical thinking, and interpersonal group skills. Twenty years ago, that figure was only 15%" (Merisotis & Phipps, 2000, p. 78). According to McCabe (2000a), "Eighty percent of new jobs will require some postsecondary education" (p. vii). McCabe (2000a, 2000b) believed that the workplace would be different in the future. He argued that, in the global economy of the future, jobs would become more complex. America's future would depend more on an educated workforce. McCabe (2000a, 2000b) also noted that demographic changes, such as an aging population, increasing numbers of minorities, and changes in family life, would affect higher education. "Colleges will have the responsibility of raising education attainment for this more diverse and less prepared student population" (McCabe, 2000b, p. 181).

"Providing effective developmental programs that give underprepared students the opportunity to qualify for good jobs is an essential mission for American higher education" (McCabe, 2000b, p. 180). Eliminating developmental education, as critics of developmental education suggested (Healy, 1998; Selingo, 2000), would limit educational opportunities for the poor, who were the majority of those who needed remediation (Boylan, Bonham, & White, 1999; Boylan & Saxon, 1998a; McCabe, 2000a;

McCabe & Day, 1998). It would also limit opportunities for minorities. According to McCabe and Day (1998) and McCabe (2000a, 2000b), minorities were the fastest growing segment of the population, and they would eventually be the majority of the nation's population. Yet, minorities were more likely to have lower incomes, and poverty was the primary cause of educational underpreparation (McCabe, 2000a, 2000b). By eliminating developmental education, the country might only be hurting itself. There was a direct relationship between the amount of education citizens had and the economic prosperity of a state (Lavin & Hyllegard, 1996; McCabe & Day, 1998; Phipps, 1998).

Mathematics required remediation more often than any other subject in North Dakota as well as in the rest of the nation. It was important that developmental students were provided access to developmental programs that were effective as mathematics became more important in a global and technical society. The results of this study included descriptions of six developmental mathematics programs in the NDUS. In addition, the practices of each program were contrasted and compared to "best practice" in an effort to answer the following research questions.

Research Questions

1. What were the policies, organizational, and instructional characteristics of each public postsecondary developmental mathematics program in North Dakota?
2. How did the policies, organizational, and instructional characteristics of each public postsecondary developmental mathematics program in North Dakota compare to "best practice" in developmental education?
3. How did the programs contrast across institutional types?

Definition of Terms

The following terms were defined to clarify their meaning as they were used throughout this paper. Other terms were defined as they were introduced.

1. Developmental education courses: "Courses in reading, writing, or mathematics for college students lacking those skills necessary to perform college level work at the level required by the institution" (National Center for Education Statistics, 1996, p. 2).
2. Developmental support services: services supporting developmental courses that can include orientations, seminars, learning labs, workshops, tutoring, Supplemental Instruction, and counseling.
3. Developmental education: all developmental education courses and support services.
4. Success in a course: obtaining a grade of C or better.
5. Success in developmental education:

The success of developmental students is typically measured in three ways: (a) the rate at which they pass developmental courses, (b) the rate at which those who pass developmental courses later pass regular courses in the same subject, and (c) the rate at which developmental students are retained through to graduation. (Boylan & Saxon, 1998b, p. 9)

6. Developmental education students: those students participating in developmental education.
7. Developmental mathematics education: mathematics courses and support services for college students taking mathematics courses numbered below Math 103 College Algebra.
8. College level: defined by the institution to be non-developmental.

9. Institutional type: as defined by the Carnegie Classification of Institutions of Higher Education (Carnegie Foundation for the Advancement of Teaching, 1994).
10. "Best practice": The policies and practices identified in the literature that contribute to student success in developmental education.

Assumptions, Limitations, and Delimitations of the Study

Assumptions

The following assumptions were made with regard to this study:

1. It was assumed that the policies and practices of the developmental mathematics programs could be accessed at each of the institutions in NDUS through the collection of developmental mathematics grade distribution data and course syllabi, interviews with directors and instructors of developmental mathematics programs, and observations of developmental mathematics classrooms. Many of the practices and policies were accessed, but the use of some of the instructional practices, such as the use of learning theories, constructivist or discovery based teaching methods, could not be confidently determined in this study. One of the studied institutions did not send grade data, and another institution did not include dropped students in their data.
2. No one "proved" that what Boylan and Saxon (1999), as well as others like Roueche, identified as "best practice" were actually that. These "best practices" were only related to better programs and student success.

Limitations and Delimitations

A limitation is that which limits the study and is beyond the control of the researcher. A delimitation also limits the study, but is imposed on the study by the researcher. The following were the limitations and delimitations of this study:

1. Interviews were conducted with the directors of the developmental mathematics programs. Depending on his or her position and training, each director had a different amount of information about developmental mathematics education. Depending on the amount of and quality of information, the program descriptions, comparisons to "best practice," and contrasts across institutional types might have been limited.
2. The study was limited by any inability to get interviewees to openly respond to the questions.
3. The study was limited due to the inability to test the "best practices" of developmental education to determine if they really were such.
4. The study was delimited because the researcher was only studying postsecondary developmental mathematics programs at six of the 11 public institutions in one state, North Dakota.
5. The study was delimited by the "best practice" model of developmental education identified by the researcher using the literature. It was the researcher's judgment and the review of the literature that was used to develop this model.
6. The study was delimited because only a few instructors of developmental mathematics courses, not all instructors, were interviewed at each institution. This limited the amount of data collected to describe, compare, and contrast the

instructional practices and policies of each of the institutions and institutional types.

As a result, this limited the conclusions that were drawn for each program and for all of the developmental mathematics programs in the study and in the NDUS.

7. The study was delimited by the researcher's data collection methods. Extensive classroom observations would have been another method to collect data regarding instructional practices and policies, but one class meeting of each developmental math course at each of the six institutions was observed only once. If more classes were observed, more information could have been collected that might have allowed broader conclusions to be reached.

Organization of the Remainder of the Study

Postsecondary developmental mathematics education in North Dakota was examined in this study. Postsecondary developmental mathematics programs at six of the 11 institutions were described. The policies, organizational and instructional characteristics of the six programs were compared to "best practice" in developmental education, and the practices of these programs were contrasted across institutional types.

The data were collected using the following methods. First, developmental mathematics grade distribution data were collected from the institutions. Second, developmental mathematics course syllabi were collected and analyzed for evidence of "best practice" and other general items. Third, the researcher visited each campus and observed the instruction used in each developmental mathematics program. Fourth, while visiting the institutions, interviews were conducted with the director of the

developmental mathematics program and with a few developmental mathematics instructors. The methodology and research design are described in more detail in the third chapter, Research Methodology.

“Essentially the research indicates that developmental programs employing sound organizational and teaching strategies have been consistently linked to higher passing and completion rates in courses, better students grades, and higher retention rates” (Boylan, Bonham, & White, 1999, p. 94). The more successful postsecondary developmental programs tended to use more of these practices (Boylan, Bonham, & White, 1999). The next chapter provides a synthesis and evaluation of the literature on developmental education, including those practices considered to be “best.”

LITERATURE REVIEW

Chapter Introduction

In this chapter the literature related to developmental education and developmental mathematics education are presented. It is focused on what is considered "best practice" in developmental education. The majority of the chapter includes theme development of the literature regarding the state of and research in developmental education. The criteria for selecting the literature, the context of the problem, and a review of methodologies used for this type of research are also explained. After the presentation of literature, it is summarized and evaluated for weaknesses and strengths, for gaps and saturation points, and for avenues for further inquiry.

Criteria for Selecting the Literature

The majority of the literature was from studies done by the National Center for Education Statistics and the National Center for Developmental Education. More specific, the review includes information from the report, Remedial Education at Higher Education Institutions Fall 1995 (National Center for Education Statistics, 1996; see also Adelman, 1999), and from the many publications that resulted from the National Study of Developmental Education (Boylan, 1999b; Boylan, Bliss, & Bonham, 1993, 1997; Boylan & Bonham, 1992; Boylan, Bonham, & Bliss, 1994a, 1994b; Boylan, Bonham, Bliss, & Saxon, 1995; Boylan, Bonham, Claxton, & Bliss, 1992; Boylan, Bonham, Jackson, & Saxon, 1994, 1995) conducted by the National Center for Developmental

Education throughout the 1990s. Most of the other literature that was used included: (a) studies done by J. E. Roueche and his colleagues (Roueche, 1973; Roueche & Kirk, 1973; Roueche & Roueche, 1993, 1999a; Roueche & Snow, 1977); (b) sources identified in Annotated Research Bibliographies in Developmental Education: Developmental Mathematics (Bonham, et al., 2000); (c) sources and information found in the literature review, What Works in Remediation: Lessons from 30 Years of Research by Boylan and Saxon (1999); (d) reports written by McCabe (2000a) and McCabe and Day (1998); and (e) information from the national organizations in developmental education and developmental mathematics, including the National Association for Developmental Education, the National Center for Developmental Education, and the American Mathematical Association for Two-Year Colleges. These sources and studies were chosen and used because they provided the most recent, comprehensive, and accurate information on developmental education.

The research conducted by Roueche and his colleagues (Roueche, 1973; Roueche & Kirk, 1973; Roueche & Roueche, 1993, 1999a; Roueche & Snow, 1997), McCabe (2000a), the National Center for Education Statistics (1991, 1996, 2000; see also Adelman, 1999), and the National Center for Developmental Education (Boylan, 1999b; Boylan, Bliss, & Bonham, 1993, 1997; Boylan & Bonham, 1992; Boylan, Bonham, & Bliss, 1994a, 1994b; Boylan, Bonham, Bliss, & Saxon, 1995; Boylan, Bonham, Claxton, & Bliss, 1992; Boylan, Bonham, Jackson, & Saxon, 1994, 1995) were large studies that included all types of institutions across the nation and appeared to have employed sound research methodologies.

The literature review of developmental education that was done by Boylan and Saxon (1999) was also large and comprehensive. It yielded a literature base of approximately 600 books, articles, and technical reports from the last 30 years. These 600 sources were reduced to approximately 200 once each piece was examined and required to meet a set criteria (Boylan & Saxon, 1999). This review (Boylan & Saxon, 1999) was often used for summative information, as a springboard for identifying other sources, and as a guide or reference to many of the "best practices."

The literature did have some weaknesses. Much of the descriptive literature was becoming outdated. The data from the studies by the National Center for Education Statistics (1991, 1996) and the National Center for Developmental Education (Boylan, 1999b; Boylan, Bliss, & Bonham, 1993, 1997; Boylan & Bonham, 1992; Boylan, Bonham, & Bliss, 1994a, 1994b; Boylan, Bonham, Bliss, & Saxon, 1995; Boylan, Bonham, Claxton, & Bliss, 1992; Boylan, Bonham, Jackson, & Saxon, 1994, 1995) were between 7 to 12 years old. Funding cuts prevented or delayed studies by the National Center for Education Statistics from being completed and published (H. R. Boylan, personal communication, January, 2002). According to C. Adelman (personal communication, January 3, 2002), new transcript data from the years 1992 to 2000 would be available spring 2002.

The developmental mathematics literature was limited. There were few studies that specifically examined developmental mathematics with large numbers of students at a variety of institutions and areas of the country. Most of the developmental mathematics education research was action research. It was performed at one institution

or with a small number of students. This made it less generalizable than other forms of research. For these reasons, much of the literature on “best practice” in developmental education came from the larger studies that tended to focus on developmental education in general, not applied to one specific subject area like mathematics.

Finally, the literature on “best practice” in developmental education identified practices and policies that were found in successful programs or that were correlated with student success. No one proved that these practices caused student success or why these practices tended to be associated with student success, only that they were related to it.

Context of the Problem

The following sections are intended to provide background and insight into the context of developmental education. Remedial education and developmental education are differentiated so the reader can understand the difference. The history of developmental education is documented to illustrate how it developed into its current form. The different types of developmental students are described to provide insight into who participates in developmental education. Estimates of the costs of developmental education are given, and the opinions of critics of developmental education are explained in order to provide an opposing viewpoint. This section concludes with an explanation of the Carnegie Classification of Institutions of Higher Education (Carnegie Foundation for the Advancement of Teaching, 1994).

Remedial Education Versus Developmental Education

A number of terms were used to describe courses or services that help underprepared college students. The most common terms were "remedial education" and "developmental education." Often the literature did not distinguish between the two terms, but there was a difference. For the purposes of this study, the researcher decided to use the term developmental education.

Remedial education usually was associated with a few things. First, the term "remedial" implied a student had some sort of academic deficiency that needed to be fixed or overcome. This gave remedial education a negative connotation and likened it to a medical model where (a) a diagnosis was made of the student's weaknesses, (b) treatments were prescribed, and (c) the learner was evaluated, much like a patient, to determine if the treatment was successful (Cassaza, 1999). Second, remedial often referred exclusively to pre-college level courses, not other services offered to students (Boylan, Bonham, & White, 1999). Third, the main goal of remedial education was to improve students' academic skills. It wanted to fix or remediate students' academic skills in order to prepare them for college level courses. It was not concerned so much with students' non-cognitive skills.

Developmental educators believed the problem was more complex.

We began to understand that poor academic performance involved far more complex factors than a student's being unable to solve for x in an algebraic equation or write a complete sentence using proper grammar. If such deficiencies were the only problems for students having difficulty in college, simple remediation would be an appropriate solution for everyone. (Boylan & Saxon, 1998b, p. 7)

For these and other reasons, developmental education had a more holistic approach to helping college students. It was concerned not only with cognitive development, but also with affective factors like, locus of control, attitudes toward learning, self-concept, self-esteem, autonomy, and the ability to seek help. It was based on a belief that academic and personal growth were linked (Boylan & Saxon, 1998b). Developmental educators sought to develop the whole student and his or her talents, not just alleviate deficiencies in academic areas.

Developmental education included courses, counseling, tutoring, Supplemental Instruction, orientations, seminars, learning labs, and workshops. According to Cross (1976), developmental education was like an umbrella, under which a variety of services existed that maximized the many talents of students. Boylan, Bonham, and White (1999) described developmental education as a continuum of services with remedial courses on the low end and tutoring or learning assistance centers on the high end. According to the National Association for Developmental Education (2001a):

Developmental education is a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to the individual differences and special needs among learners.

Developmental education programs and services commonly address academic preparedness, diagnostic assessment and placement, development of general and discipline-specific strategies, and affective barriers to learning.

Developmental education includes, but is not limited to: all forms of learning assistance, such as tutoring, mentoring, and Supplemental Instruction; personal, academic, and career counseling; academic advisement; and coursework. (Definition section, para. 1-3)

The National Association for Developmental Education (2001a) had a list of goals of developmental education.

1. To preserve and make possible educational opportunity for each postsecondary learner.
2. To develop in each learner the skills and attitudes necessary for the attainment of academic, career, and life goals.
3. To ensure proper placement by assessing each learner's level of preparedness for college coursework.
4. To maintain academic standards by enabling learners to acquire competencies needed for success in mainstream college courses.
5. To enhance the retention of students.
6. To promote the continued development and application of cognitive and affective learning theory. (Goals section, para. 1)

These definitions and goals did not provide colleges with a definitive definition of developmental education. Rather, they provided some insight into what developmental education was in general. Each institution or state had to decide what would be considered developmental and how students would be assessed to determine if they required developmental education. Developmental education was arbitrary and relative (Astin, 1998; Merisotis & Phipps, 2000). As Astin (1998) pointed out:

Most remedial students turn out to be simply those who have the lowest scores on some sort of normative measurement—standardized tests, school grades, and the like. But where we draw the line is completely arbitrary. Second, the “norms” that define a “low” score are highly variable from one setting to another. (para. 12, 13)

In summary, remedial education focused on alleviating deficiencies in students' academic skills and was usually done through coursework. Developmental education was more holistic. It was offered under an umbrella of services and sought to develop the entire student, not just fix their academic inadequacies. Institutions could use these definitions to guide their developmental education programs, but each institution had to

decide which students would participate in developmental education. These decisions often were made in arbitrary and relative ways (Astin, 1998).

History of Developmental Education

Developmental education is not a new phenomenon. It has been a part of American higher education since its beginnings. Its history has paralleled the history of and changes in higher education in general.

Casazza (1995) attributed changes in the educational system to the constant tensions between reformists and traditionalists. The tensions were centered about institutional purpose, students, and curriculum and occurred and recurred throughout the history of higher education. One of these tensions stemmed from the reformists desire for change; while the traditionalists feared that change would bring about a lowering of academic standards (Casazza, 1995). This tension continued with regard to developmental education.

Casazza (1995) divided her historical overview of developmental education into three periods: 1700 to 1862, 1862 to 1960, and 1960 to 2000. For each of these time periods she examined: (a) the purpose of postsecondary education, (b) who should attend college, and (c) what the curriculum should look like. The following paragraphs highlight and summarize what Casazza (1995) wrote.

During the period from 1700 to 1862, there was a "tension associated with founding colleges in a new democracy with only the classical institutions of Europe to use as reference points" (Casazza, 1995, para. 8). During this time period, American institutions of higher education trained and educated male clergy so that they could lead

society as well as help maintain European cultural norms. Higher education was for elite males from certain families. The members of these families had backgrounds in Greek and Latin and were of high moral character. All students had to learn the same curriculum, the classical curriculum, and they had to learn it the same way. There were instances when higher education did reach out to diverse populations, such as the American Indians, but these actions were usually criticized and seen as lowering standards.

Eventually colleges found that they needed students in order to survive financially. They began admitting students that they did not consider to be ready for college. In order to help these students, preparatory departments were formed. The enrollments of these departments often exceeded the regular college enrollments. This typically was due to the lack of secondary schools at that time. Students just did not have the necessary background, especially in Greek and Latin, to begin college fully prepared.

The preparatory departments were much like a high school within the college. These departments offered assistance in spelling, reading, writing, mathematics, classical languages, and other topics. These programs sometimes led to a six-year program for underprepared students. The classic preparatory department at the University of Wisconsin lasted from 1849 until 1880.

Colleges that did not have preparatory departments often offered pre-college courses and tutoring to those in need. Students were admitted "on condition" and had to get extra assistance, enroll in special classes, or receive tutoring to remain a student at the institution.

