DOCUMENT RESUME

ED 238 471 JC 830 556

AUTHOR Boylan, Hunter R.
TITLE Is Developmental Education Working? An Analysis of Research. NARDSPE Research Report, Number 2.
INSTITUTION National Association for Remedial and Developmental Studies in Post-Secondary Education.
PUB DATE 83
NOTE 55p.
AVAILABLE FROM National Association for Remedial-Developmental Studies in Postsecondary Education, c/o Dr. Harold Hild, English Language Program, Northeastern Illinois University, 5500 N. St. Louis Ave., Chicago, IL 60625 ($6.00).
PUB TYPE Information Analyses (070)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Achievement Gains; Basic Skills; *Developmental Studies Programs; Educational Research; Evaluation Criteria; Higher Education; *Program Effectiveness; *Remedial Instruction; *Remedial Programs; School Holding Power; Skill Development

ABSTRACT

An analysis of research on the effectiveness of developmental education is presented in this report. Chapter I highlights different perspectives on the role of developmental education at the college level; examines definitions and discusses the mission of developmental education; and puts forward a methodology for measuring its effectiveness. Chapter II presents research assumptions; explains the method by which the research studies were identified and analyzed; examines their characteristics; and outlines limitations relating to the study data. Chapter III presents findings about the effectiveness of developmental education in developing basic skills, improving grade point averages (GPA's), and increasing retention rates, and on other measures of impact. Chapter IV summarizes the general positive trends resulting from developmental education, including: (1) measurable gains in skill development by underprepared students; (2) reduced differences between underprepared and better prepared students as measured by standardized tests; and (3) a general improvement in student GPA's and retention rates following participation in developmental programs. This section also presents a case for developmental education and outlines miscellaneous trends. Finally, chapter V suggests areas for future research and evaluation, focusing on testing methods, follow-up performance of post-developmental students, and cost effectiveness of programs. (HB)

Is Developm
Education Wor
An Analysis of Res

NARDSP

A Research Report Prepared F

Is Developmental Education Working?
An Analysis of Research

By:
Hunter R. Boylan, Ph.D.
Director, Kellogg Institute
Appalachian State University

Editor for the Series:
Harold N. Hild
Northeastern Illinois University

A Research Report Prepared for the National Association for Remedial-Developmental Studies in Post-Secondary Education.

Spring 1983

Is Developmental Education Working?
An Analysis of Research

Written by: Hunter R. Boylan, Ph.D.
Director, Kellogg Institute
Appalachian State University

The National Association for Remedial and Developmental Studies in Post Secondary Education

First Edition 1983

CONTENTS

IS DEVELOPMENTAL EDUCATION WORKING? AN ANALYSIS OF RESEARCH

By: Hunter R. Boylan, Ph.D.
Director, Kellogg Institute
Appalachian State University

CHAPTER I

AN INTRODUCTION

Whenever a person is introduced to a layman as a developmental educato ," the inevitable next question is "What's a developmental educator?" The usual response to this question is that a developmental educator is " someone who works with underprepared college students " And there the matter is often laid to rest. The layman now thinks he knows what developmental education is all about The developmental educator, on the other hand, is reasonably certain that his role has been misunderstood In most cases, the developmental educator is right Neither he nor his role nor his students are likely to be understood by the layman nor, frequently, by his colleagues in academe This, of course, is one of the more frequently heard laments among practitioners in the field -- "Nobody understands what we're trying to do " Part of the reason for this, however, is that developmental educators have yet to articulate clearly what it is that they are trying to do.

In a field that includes instructors of writing, reading, study skills and mathematics, counselors, instructional assistants, lab managers, and program directors, basic skills programs, remedial programs, learning assistance programs, and developmental programs, this articulation problem is not surprising Everyone involved tends to look at developmental education from their own particular perspective Even those practitioners working in comprehensive programs offering a variety of different services tend to view developmental education from the perspective of their own campus and students The nomenclature used to describe programs, the types of services offered, and the characteristics of students served also tend to differ from place to place and program to program

All this is further complicated by the fact that developmental education is a comparatively new field in postsecondary education While services for underprepared students have been common to college and university campuses for over a hundred years (Maxwell, 1979) the idea that such services and the personnel who provide them represent a "professional specialty" in postsecondary education is a new one In fact, it is an idea that is not yet fully accepted within the academic community

Complete acceptance of the field, the personnel who work in it, and the students served by it, has been delayed for several reasons One of these has to do with a lack of definition and unified terminology in the field Another is the lack of research indicating that developmental education actually does what it is supposed to do.

These two problems are interwoven in that the lack of a cohesive definition of developmental education makes it difficult to measure the outcomes of developmental activities We cannot adequately assess that which we have not adequately defined A necessary first step in measuring the effectiveness of developmental education, therefore, is to establish some definitions of what the field is and what it is supposed to do

Developmental Education: Towards a Definition

Although the field has not been adequately defined in the literature, a great deal has been written about the types of programs that tend to be included in the field Much of this writing has focussed on the issue of remedial versus developmental programs Roueche and Wheeler (1973, p 223) for instance, claim that remedial programs as designed to remove " student deficiencies in order that the student may enter a program for which he was previously ineligible " Developmental programs, on the other hand, are concerned with " skills and attitudes and may not have anything to do with making a student eligible for another program "

K Patricia Cross (1976, p 31) describes the differences between remedial and developmental programs in terms of their purposes In her view, "If the purpose of the program is to overcome deficiencies " then it is remedial If, however, the program is designed to

" develop the diverse talents of students, whether academic or not " then it is developmental

Both definitions have merit as far as they go They define **programs**, however, rather than the vast range of endeavors currently related to the field of developmental education A more comprehensive definition is needed and that definition should begin with the acknowledgement that the field of developmental education is a professional specialty within the larger field of postsecondary education It has many of the same characteristics of any professional specialty in education and should be recognized as such

Professional specialties in education are generally characterized by the following

1 Practitioners serve an identifiable client population

2 Some specialized training or experience is required in order to serve this client population

3 This training or experience is based upon research literature, and theory unique to the field

4 Accepted standards exist for practice and these standards are maintained through licensure certification or accreditation

5 Professional associations exist to serve and support those who practice the professional specialty

6 An identifiable mission exists which is accepted by practitioners in the field

Although developmental education is still emerging as a professional specialty, the field does have most of these characteristics Those who work in developmental programs of any kind usually serve a specific target population This population generally consists of students on a particular campus who, for one reason or another need to learn new skills or further enhance existing skills

It is generally acknowledged that the practice of developmental education requires some sort of specialized training or experience

Personnel are no longer selected at random for developmental programs Some combination of graduate training or professional development activity or experience is usually required of those who work in developmental programs Furthermore, a growing number of graduate institutions have established programs to train developmental educators Appalachian State University, Grambling State University, Lehigh University, Murray State University, and North Carolina State University offer graduate degrees with areas of concentration in developmental education

Since the late 1960 s, the body of research, literature, and theory relating to the practice of developmental education has increased dramatically Prior to 1968, few pieces of literature focussing on developmental education could be identified Since that time, more than two dozen books and a multitude of articles, monographs, and research reports have appeared In addition, at least two professional journals exist to provide current information to practitioners -- the *Journal of Developmental & Remedial Education* and the *WCRA Journal* This growing body of literature forms the basis for practice in the field

Although professional licensure, certification, or accreditation procedures have not yet been established, plans are underway to implement a national certification process for developmental programs through the National Association for Remedial, Developmental Studies in Postsecondary Education (NARDSPE) A process for certifying developmental education specialists currently exists through the Kellogg Institute for the Training and Certification of Developmental Educators

A variety of national and regional professional associations exist in the field of developmental education NARDSPE is the largest of these and the Western College Reading Association (WCRA), although regional in focus, has been serving professionals in the field since the mid-1960's These associations are joined by a host of state and regional associations serving and supporting practitioners

While debate on the mission of developmental education continues, a consensus seems to be emerging in the literature and among leaders in the field The emerging mission of developmental education would seem to include the following components

- Promoting educational opportunity by training underprepared college students in the skills necessary for success

- Promoting academic excellence by developing existing academic skills for all college students.

- Promoting educational efficiency by retaining greater numbers of potentially successful students who might otherwise be lost

Developmental education does seem to meet the requirements for a professional specialty within postsecondary education. Those who perform this specialty include not only practitioners but also those who conduct research in the field or who train current or aspiring professionals

Developmental education might then be defined as a professional specialty concerned with promoting educational opportunity, academic skill development, and educational efficiency in postsecondary education A developmental educator would then be anyone who has a primary professional commitment to this specialty as evidenced by his or her participation in research, training, or delivery of services in the field And developmental programs would include any organizational entity on a college campus designed to accomplish the mission of the field

Measuring Effectiveness in Developmental Education

If one accept the definition of developmental education as stated here, a methodology for measuring effectiveness in the field becomes apparent That methodology should be based on the mission of the professional specialty known as developmental education The question to be asked in measuring the effectiveness of developmental education is, "Does the field accomplish its mission?" Specifically, do the field's programs and services 1) promote educational opportunity by training underprepared students in the skills necessary for success, 2) promote academic excellence by developing existing academic skills for all college students, and 3) promote educational efficiency by retaining greater numbers of potentially successful students who might otherwise be lost?

In answering the first question, it is necessary to establish a link between skills training and equal educational opportunity. In *Beyond the Open Door*, K. Patricia Cross (1974) builds a strong case for this linkage. In her view, students who have been unsuccessful in past educational experiences must have access to special assistance if they are to have any chance of taking advantage of open admissions policies in order to attain a college education. Without this special assistance, she argues that the "open door" soon becomes a "revolving door" and that the concept of equal educational opportunity becomes a mockery. In essence, we cannot have equality of opportunity in postsecondary education without developmental programs to train underprepared students in basic skills. To determine whether or not developmental programs are working to promote educational opportunity, therefore, we must ask whether or not they are successful in training underprepared students in basic academic skill areas.

With regard to the promotion of academic excellence, it would stand to reason that students cannot meet high academic standards until they have mastered basic academic skills. Before one can expect excellence of a student, that student must first be competent. Developmental education serves to promote academic standards by building the skills necessary to meet academic standards. If developmental programs are successful in promoting academic excellence, therefore, they should be able to demonstrate that they have improved student competence. They should also provide evidence that their services not only enhance basic skills but that the students who participate in these services are able to attain fairly high grades in later course work.

Insofar as educational efficiency is concerned, it would certainly be more efficient -- not to mention cost-effective -- to try to retain potentially successful students than to constantly have to replace currently enrolled students through new admissions. It is often argued, however, that efficiency can be accomplished through the use of selective admissions standards. There are two flaws in this argument. In the first place, selective admissions has not improved retention efficiency in the past. Jencks and Riesman point out that the percentage of students retained through graduation at four year institutions has remained at a relatively constant 33% for the last several decades (1968). No new evidence has been presented to show that this percentage changes regardless of the admissions

criteria used to select students There is little historical or factual information to support the contention that selective admissions procedures lead to improved retention

The second flaw in the argument for selective admissions as an efficiency measure is that the college age population has declined substantially in the last decade and will continue to do so through the remainder of the 1980's (Carnegie Council on Policy Studies in Higher Education, 1980) During a period when there are fewer students available -- at any level of academic skill -- it seems unlikely that many colleges or universities will be able to fill their classrooms with larger numbers of better-qualified students

At present, therefore, the best method of improving efficiency in retention is to develop and maintain programs that will lead to greater retention for all students As this is one of the mission components of developmental programs, their effectiveness may be measured by the degree to which their students are retained as compared to normal retention rates for students who do not participate in these programs

It would appear that the question of whether or not developmental education is working can be answered by asking three subquestions

1 Do developmental programs actually improve the basic academic skills of those students who participate in them?

2 Do students who participate in developmental programs actually obtain higher grades following participation?

3 Do students who participate in developmental programs actually have higher rates of retention than those who do not?

Fortunately, an increasing amount of program evaluation and research has taken place in the last decade in an effort to answer these questions While data gathering techniques differ from campus to campus and study to study and while different aspects of these questions are investigated in a variety of different ways, there is more information available to answer these questions today than at any point in the history of developmental education It is the purpose of this report to analyze the available data in order to

provide at least a preliminary answer to the general question, "Is developmental education working?"

CHAPTER II

Research Assumptions

For the purpose of this study, it was assumed that developmental education activities might be judged as effective if evidence suggested that these activities:

1 Improved the basic academic skills of those who participated in them.

2 Resulted in higher grades for those who participated in them when compared to those who did not participate.

3 Resulted in higher rates of retention for those who participated in them when compared to those who did not participate

Admittedly, these assumptions are difficult to test empirically Many of the measures used to test these assumptions are indirect and suffer from a number of limitations. Nevertheless, it is assumed that while individual studies testing these assumptions do have limitations, the general trends of all studies can provide useful information in answering the question of whether or not developmental education is working

Methodology

In order to obtain information relevant to the assumptions of this study, a survey of research and evaluation reports from the field of developmental education was undertaken. The survey was carried out utilizing the following sources:

- The literature in the field was reviewed to identify articles, books, and monographs that included documentation of the effectiveness of developmental education activities

- A DIALOG search was conducted to identify unpublished reports documenting the effectiveness of various developmental education activities

- A call for program reports documenting the effectiveness of developmental education activities was issued through the **NARDSPE Newsletter.**

The reports gathered from these sources were then reviewed to determine their suitability for inclusion in this study. In order to be included in the study, reports must have met the following criteria:

Suitability of setting. Reports must have been based on studies undertaken at institutions of postsecondary education in the United States or Canada.

Suitability of subjects. Reports must have been based on programs serving adults enrolled on a full-time or part-time basis. These adults must have been classified in one way or another as "developmental students."

Nature of data. Reports must have included quantifiable outcomes of developmental education activities using data that was as objective as possible.

Recency of data. Reports must have been undertaken within the last ten years and, preferably, after 1975.

Method of study. Reports must have been free of serious methodological flaws such as comparison of differential levels of aptitude or inappropriate use of statistics.

Relevance of information. Reports must have investigated some area of developmental education activity relevant to the assumptions under consideration in this study.

A total of 73 reports were reviewed in this manner. Of these, 51 were considered appropriate for inclusion in the study. These reports were then classified according to the assumptions which they addressed and the types of data which they employed. A summary of the reports relating to each assumption and the data resulting from these reports was then developed. The trends from all reports relating to a given assumption were then analyzed.

Characteristics of Reports

The vast majority of program reports reviewed in this study were undertaken for the purpose of program evaluation Most of these reports were "in-house" studies Only a handful were conducted by outside evaluators and consultants

Measures typically employed in these reports were gain scores from pre-test to post test on standardized instruments, grade point averages of students at various points following participation in developmental education activities, and retention rates of students at various points following participation in developmental education activities In reports assessing grade point averages and retention rates, experimental and control groups were often used for comparative purposes Experimental and control groups were also used frequently in assessing gain scores

The majority of the reports considered in this study were unpublished For the most part, the reports were part of a program evaluation plan and were not intended for publication Many of the published documents were designed to report applications of new techniques and evaluative data was included primarily as a means of validating the new techniques Some of the reports cited in this study have appeared in print elsewhere as supportive data for the validity of developmental education generally or the appropriateness of some specific technique for working with developmental students

Limitations

Much of the data cited here was obtained initially through program evaluation activities In those cases where the evaluation was conducted primarily for the purpose of program refinement or improvement, it is likely that negative data was included as well as positive data In those cases where reports were prepared to demonstrate program effectiveness or to establish accountability, it is possible that some negative data may have been glossed over in order to improve a program s appearance It is probable that most "in-house" program evaluation reports were designed to accomplish both purposes In either case, program evaluation reports were usually not designed as experimental research efforts While

they may have met many of the methodological requirements for experimental research, the potential subjectivity of these reports represents a possible limitation to the validity and reliability of the data

The published reports cited here suffer from the limitation of all such reports Specifically, professional journals are more likely to report successful outcomes than unsuccessful outcomes. As a result, there is no way of knowing how many studies may have been undertaken which suggested negative outcomes for developmental education activities The fact that a variety of sources of unpublished reports were tapped in gathering data for this study controls this to degree but does not eliminate this limitation entirely.

Finally the techniques used to assess the effectiveness of various developmental education activities are, themselves, subject to limitations of validity and reliability. The use of gain scores, for instance, is subject to limitations brought about by the so-called interactive effect of pretesting The use of grade point averages as a measure of the effect of a particular treatment does not take into account a number of intervening variables that may also have an impact on student grades Similarly, retention data is also subject to an even greater number of variables outside of treatment that may affect the persistence of any given student

Certainly there are many limitations to the data used in this study It is hoped however, that the general trends suggested by the data will be useful as a starting point in assessing the general effectiveness of developmental education activities at postsecondary institutions across the country

CHAPTER III

RESULTS

Basic Skills Development

One of the most common components of developmental education programs is a curriculum devoted to basic skills improvement in areas such as reading, writing, mathematics, and science. It is assumed by most developmental educators that participation in these courses will enhance students' basic skill levels and enable them to meet the requirements of regular college academic work. This, in turn, is assumed to be related to better grades, improved retention, and improved ability to meet academic standards on the part of underprepared students

Since these assumptions are one of the cornerstones in the design and implementation of developmental programs, it is important to know if they are accurate assumptions The initial question to be answered, therefore, is whether or not students participating in basic skill courses actually do improve their skills. This question has been explored by a variety of reports using gain scores from pre-test to post-test as a measure of the effectiveness of basic skill courses in improving student learning skills

One of the earlier studies assessing the impact of basic skills courses in developmental programs was reported in 1975 (Donovan) In a study conducted by the Institute for Services to Education, thirteen colleges offering basic skills courses contributed data on student gain scores in the areas of English, mathematics, and science The data indicated that students who participated in basic skills courses through some sort of developmental program consistently showed substantial gain scores from pre-test to post-test on standardized testing instruments. Furthermore, those underprepared students who participated in basic skills courses demonstrated consistently higher scores on the standardized tests than those who did not participate in such courses

Later studies of basic skills courses in developmental programs

have yielded similar results Carter (1976), reporting on basic skills courses at the Community College of the Finger Lakes found that students enrolled in those courses showed consistent increases from pre-test to post-test on a combination of standardized and locally-developed achievement measures Of those participating in the program, 71% showed gains in reading scores, 68% showed gains in English scores, and 55% showed gains in mathematics scores

Sutherland and Sutherland (1982) found that students enrolled in a combination of basic reading and writing courses demonstrated significant gains on standardized measures of reading, vocabulary, and writing They also showed substantial gains on writing samples graded by English instructors from outside the developmental program The gains demonstrated by underprepared students on these measures were also superior to those shown by a control group of better-prepared students enrolled in regular reading and writing courses

These findings are consistent with results of studies of student gain scores in individual basic skills courses at other institutions across the country Reports from Bowling Green State University (Whimbey, Boylan, and Burke, 1979), Eastfield Community College (Swinoling, 1982), the University of Georgia (Moore, 1977), Grant MacEwan Community College (Allarie, 1979), Keystone Junior College (Bellucci, 1981), and Winston-Salem State University (Supplementary Education Program, 1982) all suggest that those students who participate in basic skills courses improve their skills as measured by a wide variety of standardized and locally-developed tests

In reviewing studies of gain scores in basic skills courses, three trends seem to emerge

1 Those who enroll in basic skill courses show measureable gains in basic skill development

2 Those who enroll in basic skill courses tend to show greater gains in basic skills than similar students who do not enroll in such courses

3 Underprepared students who enroll in basic skill courses

frequently score higher on standardized tests administered following the course than better prepared students who took the same test but did not enroll in the basic skill courses

This latter finding was not reported consistently nor was it found in all basic skill areas In some cases, underprepared students do perform better on standardized tests of basic skills than their more well-prepared peers following participation in basic skill courses In other cases, while underprepared students show definite improvement in basic skills their scores on standardized tests are still lower than those of better prepared students who do not take basic skill courses

Gain scores for underprepared students also seem to be greater in some basic skill areas than in others In all the reports reviewed, for instance, gains in reading seemed to be greatest Gains in composition skills were next greatest followed by gains in mathematics skills A tendency was also noticed for underprepared students to score higher on locally-developed criterion referenced tests keyed to course objectives than on standardized tests keyed to normative data

The research clearly suggests that underprepared students who participate in basic skills development courses improve their academic skills as measured by a wide variety of instruments The extent of this improvement, however, varies from program to program and from subject to subject The improvement in basic skills following participation in skill development courses does seem to be consistent regardless of the instructional techniques employed or the measurements used to assess gain

Another measure of the effectiveness of basic skill courses has also been proposed by Suen (1979) He has proposed a sophisticated statistical approach using Step-Wise Regression to separate the effects of various treatments designed to improve grade point averages for underprepared students Using this approach to assess the Special Services program at the University of Wisconsin - Oshkosh, Suen found that the basic skill courses in mathematics, English, and study skills appeared to have the greatest influence on improved GPA for students participating in the program While this study remains to be replicated at other institutions, it does provide further evidence of the effectiveness of basic skill courses in

improving students' ability to succeed in college .

GPA Improvement

If developmental programs are designed to help underprepared students succeed in college, then they should be able to demonstrate that the students they serve actually attain appropriate grade point averages. Even if they can show that skill development takes place following basic skill courses, this development is irrelevant unless it enables students to meet academic standards. The question to be addressed, then, is "Do developmental students actually improve their grade point averages following participation in the developmental program and is this improvement greater for those students who participate than those who do not?"

A great deal of effort has been directed to answering this question. Analysis of grade point averages has tended to be one of the primary evaluation measures for developmental programs. As a result, a substantial amount of data exists to assess the impact of developmental education activities on grade point averages.

An early study of this issue was conducted by Franco (1975) at California State University - Fullerton. He found that students participating in a developmental program combining basic skills instruction with tutoring, counseling, and learning assistance activities improved their cumulative grades from an average of 1.73 upon entry to 2.32 following a year's participation in the program.

A study of a basic skill curriculum combined with peer counseling at the University of Florida (Burton Brown, 1975) revealed that 80% of the students who entered the program with grades below 2.00 were able to raise their grade point averages above 2.00 following participation in the program. At Keystone Junior College in Pennsylvania, forty-six underprepared students whose predicted GPA was less than a 2.00 were provided with a combination of counseling and basic skills development courses following entry into the college. Of these, twenty-eight (61%) exceeded their predicted GPA after only one academic term of participation in the program (Farkas, 1982). In a similar study of the developmental program at Bowling Green State University, a group of 326 underprepared students were enrolled in individualized basic skill

courses and provided with peer counseling and tutoring. Of this group, 225 (69%) raised their GPA by an average of 20% following a semester's participation For those students who participated for an entire year, the average gain in GPA was approximately 30% (Boylan, 1979) These findings were supported by other studies conducted by Turner and others (1974), Burgess and others (1976), and Haburton (1977) In addition, Thompson (1977) reviewed studies of underprepared students at eighteen different college campuses and concluded that participation in a basic skills development program was related to improvement in grade point average on practically every campus studied

Several studies of grade point average improvement have also used control groups to determine if such improvement was related to participation in developmental programs or if it was simply the result of maturation or some other factor Roueche and Snow (1977) cite data from El Paso Community College comparing a random sample of entering freshmen with participants in a basic skills oriented developmental program Both groups enrolled in basic English and mathematics courses during the first semester of their freshman year at the college Of the students selected at random, 73% failed their English courses and 80% failed their mathematics courses For those participating in the developmental program, only 29% failed English and 20% failed mathematics courses

In a well-designed study by Martin and Blanc (1981, p 22) at the University of Missouri - Kansas City, the authors compared the grade point averages of 72 students who had participated in the developmental program with a matched group of 131 students who had not The comparisons were made for a two year period with year end GPA being computed for both groups. The results indicated that those who participated in the program ' showed a marked tendency to earn higher grades."

A similar study was conducted by Peck and others (1981) at Mid-America Nazarene College Using an experimental group of 44 students who had participated in the developmental program and an experimental group of 16 students of similar backgrounds who had not participated in the program, the authors compared the grades of both groups over a one-year period Among the students who had participated in the program, 72 7% attained grade averages of C or better (including 47 8% who earned grade averages of A or

B) For the students who did not participate in the program, only 56 2% earned grade averages of C or better

Some of the most extensive research on grade point average improvement has been conducted by the State Education Department of New York in the evaluation of the State's Higher Education Opportunity Program (HEOP) In the 1975 HEOP study a group of 370 HEOP participants were compared with 274 students of similar economic and academic backgrounds who did not participate in the HEOP program During 1974, the mean GPA for HEOP students was 2 33 while the mean GPA for similar students not participating in the program was 1 79 A sample of over-all GPA for graduates of HEOP students in that year was also matched to a sample of over-all GPA for non-HEOP students The HEOP students who graduated in 1974 had an over-all mean GPA of 2 65 while those students who did not participate in the program graduated with a mean GPA of 2 39 (The University of the State of New York, Office of Higher and Professional Education, 1975) Similar results were found in later studies of HEOP students participating in developmental programs across the State of New York (The University of the State of New York, Bureau of Higher Education Opportunity Programs, 1980 and 1981)

The available data suggests that those who participate in developmental programs tend to improve their college grades From reviewing the data the following comments may be made

1 Students who participate in developmental programs are likely to obtain higher grade point averages than admissions predictors would indicate

2 Students with low grade point averages tend to improve their GPAs following participation in developmental programs

3 Students who participate in developmental programs tend to obtain higher grades than similar students who do not participate in such programs

There is strong evidence available to support the assumption that participation in developmental programs is related to improved grade point averages for underprepared students The evidence also supports the assumption that underprepared students who

participate in developmental programs obtain higher grades than similar students who do not

Rates of Retention

In recent years, an increasing amount of attention has been paid to the issue of student retention In fact, developmental programs are frequently justified on the basis of their presumed contribution to increased retention of students In a period where educational resources are limited and cost-effectiveness is a priority for post-secondary institutions, the retention issue is an important one If developmental education is to be judged as effective, developmental programs must be able to document their contribution to student retention Fortunately, retention data is one of the most frequently used evaluation measures for developmental programs.

In a survey of six Texas community colleges, Appel and others (1977) found that students receiving individualized instruction and counseling through developmental programs were retained through graduation at a much higher rate than students who did not receive these services Furthermore, the degree of retention tended to increase as the amount of services available to students increased In other words those campuses that had comprehensive developmental programs had greater retention rates than those which did not

In a study of two groups of underprepared students at the University of Minnesota Technical College Starks and Kuzmik (1977) found that those who participated in a reading and study skills program were retained at much higher levels than those who did not Of the 125 students who enrolled in the reading and study skills program during their first semester, 105 (84%) were still in school at the end of their second semester while only 86 (69%) of the control group of students who did not enroll in the program remained in school by the end of their second semester

LePage and Zachel (1978) surveyed developmental programs at 103 colleges and universities in the midwest United States to determine the rates of retention among students enrolled in these programs While the year-to-year rates of retention ranged from 25% to 90% the average retention rate reported was approximately 66% with most schools reporting retention rates of 55% to 75%

While no control groups were used in this study, the average rate of retention for all students among institutions responding to the survey was approximately 35% during the same period

A statewide study of all institutions in the University of Georgia System indicated that the retention rate for students participating in developmental programs was several percentage points higher than the average retention for all institutions in the state (Nash, 1977) Similar results were found at the University of Wisconsin - Parkside in comparing the retention rates of those who had participated in the developmental program with the institution-wide retention rate In addition, the number of students from the program placed on probation or "dropped" status was significantly lower than the institution-wide average (Cashen and others, 1981).

Using a slightly different control group, Helm and Chand (1983) compared the retention rates of students who had successfully completed developmental courses during the first semester of their freshman year with a group of students who had enrolled in these courses but failed to complete them successfully Using follow-up registration for the next three semesters, the authors found that those who had successfully completed the developmental program were retained at significantly higher rates than those who had not.

These studies have also been supported by results from a variety of other colleges and universities Comparisons of underprepared students enrolled in developmental programs with similar students not enrolled in such programs at Glendale Community College in California, Forest Park Community College in St Louis, Los Angeles City College, Mount Hood Community College in Oregon, and Pierce Junior College in Philadelphia, all suggested that those participating in developmental programs were retained at higher rates than those who did not (Starks, 1982)

This review of literature, research, and program reports did not find a single instance where participation in a developmental program was associated with lower rates of retention All the evidence reviewed suggests the participation in developmental programs is associated with higher rates of retention In reviewing the data on retention in developmental programs, it appears that

1 Students who participate in developmental programs are

retained to a greater degree than might be anticipated given their prior academic records and college entrance scores

2 Students who participate in developmental programs are more likely to be retained than similar students who do not participate in such programs

3 Students who participate in developmental programs are frequently retained at higher rates than better-prepared students who do not participate in such programs

This latter finding is particularly interesting In most cases, the reported retention rates for students in developmental programs are higher than the over-all institutional retention rates This is in spite of the fact that institution-wide retention figures are based on large numbers of students who, presumeably, are better prepared for college than those in the developmental programs Among all the measures used to support the idea that developmental education makes a positive contribution to postsecondary education, the record of developmental programs in promoting increased retention is perhaps, the strongest

Other Measures of the Impact of Developmental Education

The effects of developmental education programs in enhancing basic skills, improving grade point averages, and promoting retention were selected as evaluation criteria for this study because these factors tend to be directly related to the mission of the field. Developmental programs may also be viewed as "successful" by looking at other factors One such factor might be the degree to which students who have completed developmental courses are successful in regular courses In a follow-up study of students who completed basic skill courses in English, mathematics, and speech/communication through the developmental program at Bowling Green State University, Boylan (1977) found that the grades of these students in the next level of courses in these subject areas were higher than those of similar students who did not participate in the developmental program The differences in grades for the post-developmental education students as opposed to the non-developmental students was positive and statistically significant in English and speech communication courses While the comparison was favorable to the post-developmental students in mathematics

courses, the differences were not significant. Similar results were found by Bojar (1983) at the Community College of Philadelphia

Similar findings were reported by Shelt (1982) in a study conducted at Piedmont Technical College in South Carolina In this study, students who had completed the developmental English and mathematics courses were compared to a control group of similar students who had not enrolled in these courses Grades obtained in the regular curriculum English and mathematics courses were then compared for the two groups In the English course, 77% of the former developmental students received grades of "C" or better while only 52% of the non-developmental students received grades of "C" or better In the mathematics course, however, the non-developmental students outperformed the developmental students. 67% of the non-developmental students received grades of C or better while only 51% of the developmental students received grades of "C" or better

While the evidence is, as yet, inconclusive, participation in a developmental program's basic skill course tends to increase the likelihood of success in later courses This would also suggest that basic skills enhancement provided through developmental programs enables regular college and university faculty to hold post-developmental students accountable for normal standards of academic performance

Another factor in assessing developmental programs is that of student satisfaction with program activities While student satisfaction is not necessarily related to success in college, it does seem to be a reasonable indicator of how well developmental programs are working In fact, many early studies of developmental programs were based primarily on students' expressed level of satisfaction with program services Donovan (1975) reported that students expressed high satisfaction with developmental programs participating in the FIPSE-funded 'National Project II Alternatives to the Revolving Door " Practically all the programs reviewed as part of this project reported that participating students enjoyed their experiences and considered the programs to have been quite helpful Similar results were reported by Broadbent (1977) at Leeward Community College in Hawaii, Kinnebrew (1975) at Sacramento City College in California, and Rachavong (1979) at West Virginia State College.

It appears that underprepared students tend to rate developmental programs highly. Most students express satisfaction with the quality of services, the helpfullness of staff, and the degree to which the services have helped them be successful. Little evidence exists, however, to determine whether this expressed satisfaction is related to successful academic performance on the part of students.

CHAPTER IV

SUMMARY AND COMMENTS

Earlier efforts to assess the effectiveness of developmental education activities have met with mixed results. In using GPA as a criterion for program effectiveness, Santeusanio (1974) found as many studies showing no relationship between GPA gains and participation in developmental programs as he did showing a positive relationship. Tilman (1973) found that students completing reading and study skills programs demonstrated only slight increases in GPA while studies by Raygor (1974) and Summers (1970) revealed mixed results. In her review of the research on developmental programs prior to 1975, Cross (1976, p. 38) discovered "... positive findings, no-difference findings, and 'yes' on some tests and 'no' on others."

More recent research reports, however, have tended to show more consistently positive results. Furthermore, the reports and research studies of the latter 1970's and early 1980's have, for the most part, been designed more carefully than previous studies. The need for improved evaluation of developmental programs became quite apparent during the early 1970's. As Roueche pointed out in 1968 (p. 47), "There is a paucity of research on the efficacy of remedial programs. ... Indeed, with few exceptions, community colleges neither describe nor evaluate their endeavors in this critical area." Comments such as this by Roueche and other leaders in the field, coupled with increased demands for accountability, helped to stimulate improved research efforts. More and more programs undertook evaluation activities and did so with greater sophistication than in the past.

Evaluations of developmental programs began to use more control groups for comparative purposes and the statistical treatment of data became more sophisticated. In addition, more sophisticated evaluation criteria were applied to assessing developmental programs. Ratings of student satisfaction were employed less often and assessment of gain scores and retention data were employed more often. The availability of low-cost microprocessors also improved the quantity and quality of data to assess developmental education activities.

At the same time, it is quite possible that the quality of developmental education activities improved during the latter 1970's and early 1980's. Developmental education is a relatively new field and it no doubt took several years of trial and error before practitioners in the field were able to determine which techniques were most effective. While old techinques were being refined, new techniques were also being implemented. New approaches to diagnosis and placement, individualized instruction, and assessment of learning styles were developed and disseminated throughout the field in the late 1970's. Many of these approaches proved to be superior to those previously used in developmental education.

As a result of these factors, it is not surprising to discover increasingly consistent positive findings with regard to the effectiveness of developmental education activities. While many studies are still open to methodological questioning and while the limitations of such data as grade point averages, gain scores, and retention rates are well known, the quality of evaluation design, the quality of data, and perhaps, the quality of practice in the field seem to have improved in recent years. Consequently, the question "Is developmental education working?" can be answered affirmatively with a greater variety of higher quality information.

General Trends

The general positive trends found in this study include the following:

1. **Underprepared students who participate in basic skills courses tend to show measurable gains in skill development as assessed by a variety of standardized and locally-developed instruments.**

Such gains were found in all the studies reviewed and in all basic skill areas. There were, however, vast differences in the amount of gain reported. In some studies, gain scores from pre-test to post-test were insignificant for most students. In others, gains of several hundred percent were not uncommon. Furthermore, it appears that basic skills development activities are more likely to be successful in some areas than in others. Reading and study skills courses

appear to have the greatest measured effect on student gain Gains in composition skills also tend to be fairly substantial in most of the studies reviewed Gains in mathematics and science skills, however, tend to be slight in most cases

2. **Underprepared students who participate in basic skills courses tend to show greater measurable gains in skill development than similar students who do not participate in such courses.**

This finding is, perhaps, an obvious one Students who take a course in reading or study skills or composition or mathematics ought to know more about these subjects than students who do not take such courses As in the case of gain scores, there appears to be some difference in the relative performance of experimental and control groups according to subject matter. Those who participate in basic skills courses in composition tend to be consistently and rather substantially superior in measured skill development to those who do not participate but have similar academic backgrounds This also appears to be true for reading and study skills courses In mathematics and science, however, the differences are less apparent

3. **Basic skills development courses tend to reduce the differences between underprepared students and better prepared students as measured by standardized tests.**

In many of the reports reviewed, those who participated in basic skills courses actually scored higher on standardized tests than better prepared students who did not take the courses About a third of the reports showed this outcome In all of the remaining reports where pre-test and post-test data was available for both the experimental and the control group, the gap between the measured skills of the underprepared students and those of their better prepared peers was at least, narrowed to a significant degree

One problem in using gain scores to measure the effectiveness of developmental education activities is that such scores are not necessarily correlated with actual academic performance As Cross (1976, p 32) points out, while the developmental courses may have improved test scores, " such test taking skills may not have transferred to other coursework

If developmental courses are to be effective in improving students' skills and in helping underprepared students meet appropriate academic standards, then the gains shown on tests of basic skills must be reflected in later academic performance. The research on improvement in grade point averages seems to suggest that skill gains are correlated with improved academic performance. The findings noted in the regard are as follows:

4. **Students who participate in developmental programs tend to perform better academically than their admissions credentials would suggest.**

Several of the studies reviewed indicated that, where admissions data is used to predict entering student performance, those who participate in developmental programs usually exceed their predicted performance. Although the data on this phenomenon is limited, the information available is consistent in this regard. Of course, predictions based on admissions data assume that nothing changes between admission and the end of the student's first academic term. Obviously, for those students who outperform their predictions, something has changed. And, although the potential factors influencing that change are myriad, one that seems to have some effect is participation in a developmental program. While it is impossible to isolate the specific effect of basic skills courses on performance, it would appear that, for underprepared students, the gains in skill development may be related to academic performance that is better than might be expected given the background of such students.

5. **Students with low grade point averages tend to improve their GPA's following participation in the developmental program.**

This finding was also shown to be fairly consistent. As might be expected, there was a substantial range for GPA improvement. Some studies showed a mean gain of only a few percentage points while others showed a mean gain equivalent to a full letter grade. All studies reviewed, however, suggested that students who participated in developmental programs did improve their grade point averages to some degree. Of course, it cannot be claimed that this participation was the only reason for GPA improvement. There does, however, appear to be a clear connection between participation in developmental education activities and an increase in grade point average for most underprepared students.

6. **Underprepared students who participate in developmental programs tend to obtain higher grades than similar students who do not participate.**

The use of control groups to assess the relative impact of developmental education on GPA helps to strengthen the case for developmental services as a major contributor to improved GPA In all cases studied, those who participated in developmental programs obtained higher grade point averages than control groups of similar students who did not Again, there was a wide range of differences in the findings but most of the results were statistically significant and none of the studies indicated that the control groups performed better than the developmental students

Assuming that participation in basic skill development courses is related to improved basic skills and that these improved basic skills are related to improved grade point averages, it would be reasonable to expect that those who participate in developmental programs are retained in postsecondary institutions to a greater extent than those who do not The studies reviewed here bear out this expectation In general, it was found that

7. **Underprepared students who participate in developmental programs are retained to a greater extent than would be expected based on admissions credentials.**

Cross (1976) has suggested that, without some form of developmental education, less than 20% of the underprepared students who enter colleges and universities can be expectd to graduate Research by Ludwig and Gold (1969) and Snyder and Blocker (1970) suggests that the graduation rates for underprepared community college students who do not obtain assistance in developing their skills is about 30% Effective developmental education programs should be able to demonstrate that their students are retained in greater percentages than these And, the studies reviewed here are consistent in this regard In the LaPage and Zachel (1978) study, for instance, not a single program of those surveyed reported retention rates of less than 50% In a study of community colleges in California, MacMillan and Kester (1973) found that developmental education services consistently reduced projected attrition rates for underprepared students by at least half While the exact impact on developmental services on retention of

underprepared students is difficult to assess. It is clear that such services do have a strong positive impact

8. **Underprepared students who participate in developmental programs are more likely to be retained than those who do not.**

The use of control groups to assess the impact of developmental education on retention has vastly strengthened the case for the effectiveness of developmental education In all of the studies using control groups, those underprepared students who participated in developmental programs were consistently retained at higher rates than similar students who did not participate This suggests that such participation is a major variable in improving student retention

9. **Underprepared students who participate in developmental programs are frequently retained at higher rates than better prepared students with superior admissions credentials.**

This phenomenon was one of the more surprising findings of this study While the evidence to support this contention is mixed, the majority of reports using better prepared students for comparative purposes indicated that those who participate in developmental programs were more likely to be retained in spite of their comparative academic deficiencies In fact, of all the measures studied, this is one that most consistently favors underprepared students participating in developmental programs compared to control groups of better prepared students As Roueche and Kirk (1974) and Astin (1975 and 1977) have pointed out, individual contact with faculty does seem to have a positive impact on retention for all groups of students Since participants in developmental programs receive a great deal of individual attention in a supportive environment, it is possible that this variable alone accounts for a large part of the phenomenon In any event, if developmental programs are judged on their capacity for improving student retention, the evidence seems to suggest that this capacity is substantial It also suggests that developmental education programs do a better job of retaining the students they serve than the programs of the campus at large do in retaining all students

Building the Case for Developmental Education

In designing this study data to support the effectiveness of developmental education activities was collected at three levels -- primary, secondary and tertiary In evaluating a program, it is necessary to ask first whether or not the program actually did what it was supposed to do At the primary level of evaluation, then, the question to be asked is "Do developmental programs actually contribute to an increase in students basic academic skills?" The answer to this appears to be yes " Students who participate in basic skill development programs consistently show improvement in their academic skills

At the secondary level of education it is necessary to determine if program outcomes have any impact at the intermediate level or if there are follow-up benefits to participation In developmental education the secondary or intermediate level benefits would relate to student performance following participation in a program The question here would be "Do those students who have completed a developmental program obtain better grades than (a) might be expected and (b) other students from similar backgrounds who have not completed a program?" The answer here again appears to be "yes" There is evidence to support the notion that developmental education participation is related to improved GPA for underprepared students and that this improvement is greater than that of similar students who do not participate in developmental programs

Finally it is necessary to ask if there are any long-term or tertiary benefits associated with a given program In the case of developmental education long-term benefits could be assessed in terms of retention rates The question to be asked at this level of evaluation is "Are students who participate in developmental programs retained longer than (a) might be expected and, (b) other students from similar backgrounds who do not participate?" Here again the answer to this question appears to be "yes! The evidence clearly suggests that those who participate in developmental programs are not only retained to a greater degree than might be expected but that they are also retained to a greater degree than similarly prepared peers who do not participate in such programs

While none of the variables assessed here would be sufficient to build a solid case for the effectiveness of developmental education

by themselves, when they are taken together, a direct chain of relationships emerges Activities designed to improve basic skills tend to accomplish this objective Those students who have thus improved their basic skills are then found to obtain better grades And, this improved academic performance is assumed to be related to greater retention for those students who participate in developmental programs This chain of relationships suggests that developmental education programs are effective in accomplishing their mission of

- Promoting educational opportunity by training underprepared students in the skills necessary for success
- Promoting academic excellence by developing existing academic skills for all college students
- Promoting educational efficiency by retaining greater numbers of potentially successful students who might otherwise be lost

Miscellaneous Comments

In the course of this study, several things became apparent from reviewing the research that were not directly related to the hypotheses under consideration The data reviewed showed certain trends that may be of interest to the practitioner These are summarized below

1. **Those programs which showed the greatest gain scores, GPA improvement, and retention also tended to be comprehensive in scope, mission, and services.**

A comprehensive developmental program is one that offers a wide variety of services -- not just a few basic skills courses Such programs typically include counseling components, tutorial components, and learning assistance components in addition to basic skills courses Some of the reports reviewed suggested that the greater the variety of services provided, the more likely it was for participating students to show gains in test scores, GPA, and retention (Suen, 1979 and Boylan, 1979) Reports from programs offering a full battery of services also tended to show greater positive gains than programs offering only reading and study skills classes

During the last decade, a tendency has existed for developmental programs to expand the number and types of services offered. If there is, indeed, a tendency for more comprehensive programs to generate greater gains, then this tendency may account for the more positive reports of recent studies on the effectiveness of developmental education. The research may also suggest that developmental programs would be well-advised to provide the broadest range of services possible given staffing and budget constraints.

2. **Gain scores, GPA, and retention did not appear to be influenced by the number of students served by a given program.**

There appeared to be no major differences in reported student gains for larger or smaller developmental programs. Programs serving less than fifty students had ranges of gain similar to those serving several hundred students. While data on staff to student ratios was not available, this finding suggests that serving greater numbers of students does not necessarily reduce the effectiveness of a developmental program. Without more evidence on the relationship of staff to student ratios and student gains, it is not possible to say this with certainty. It does, however, provide an interesting question for further research.

3. **There appears to be little difference in reported results of developmental education activities for programs on community college campuses or programs on university campuses.**

Some professionals in the field have speculated that, since community colleges have been working with developmental students far longer than senior institutions, community college developmental programs may be more effective than their counterparts in universities. Others have suggested that the greater resources available on a university campus enable developmental programs at such institutions to do a more effective job. Neither argument appears to be accurate. In general, community college developmental programs and university developmental programs reported the same range of results. The one exception to this is in the area of retention. University programs typically reported greater rates of retention than community college programs. This may have more to do with the residential nature of most of the universities

reporting in this study As Astin has pointed out (1975). residential students are more likely to be retained for longer periods of time than non-residential students Since the vast majority of community colleges lack residential facilities. they may be at a disadvantage on this dimension of retention Furthermore, community college students are more likely to face difficulty with work schedules. family problems. and finances than university students These factors might be expected to have an adverse effect on retention beyond the control of community college developmental programs

4. **The amount of time spent by students in various developmental services appears to be related to the level of student success.**

This is a fairly obvious finding It is reasonable to expect that students who spend more time in tutoring. counseling. and individualized instruction would obtain greater gains on test scores. GPA. and retention Those studies that have recorded the amount of time spent by students on these activities (Supplementary Education Program. Winston-Salem State University. 1982. and Boylan. 1979) suggest that "time on task" is an important factor in student success The major practical implication of this finding is that developmental programs should continue and expand their efforts to encourage student participation in program activities

5. **Certain testing instruments appear to be used more frequently than others in assessing the gains of students participating in developmental programs.**

The instrument used most frequently to assess developmental students seems to be the *Nelson Denny Reading Test* This test was used frequently by both community college and university programs The *Comprehensive Guidance and Placement* test was used frequently in community colleges and seldom in four year institutions The *McGraw Hill Basic Skills Battery* and the *Comprehensive Test of Basic Skills*. both published by McGraw Hill. were used most frequently in four year institutions The *Wide Range Achievement Test* was used frequently by both community colleges and four year institutions as was the *Survey of Study Habits and Attitudes* Other tests employed with some frequency were the *Sequential Test of Educational Progress*. the *Stanford Achievement Test* -- Advanced Basic Battery. and the *Descriptive*

Test of Language Skills. A number of campuses reported using criterion-referenced instruments designed on the basis of local course objectives This was particularly true for the measurement of mathematics skill development

5. **Programs that required students to participate at the outset of their college experience tended to report greater gains than programs requiring participation only after students had obtained low grades.**

The question of whether participation in a developmental program should be mandatory or voluntary for underprepared students has often been raised by practitioners in the field The evidence suggests that those programs which require participation during the first semester or the first year for students who have poor admissions credentials have slightly better reported results in the area of GPA and retention than those programs which do not require participation This suggests that early intervention may be a key factor in the success of developmental programs The evidence is not sufficient to state this with certainty It does, however, appear to be an issue worthy of further research

6. **Developmental programs offering credit for participation in basic skills courses tend to show greater gains from pre-test to post-test in those courses than programs which do not offer credit.**

While the evidence on this point is still insufficient to make any definitive comment, there does appear to be a tendency for those basic skills courses offering credit to produce greater gains than those which do not This is not particularly surprising since, as Grant and Hoeber have noted (1978, p 23) "Requiring a student to take basic skills courses but refusing to grant credit certainly causes motivational problems for the student" Those courses which grant credit appear to have more motivational value to students than those which do not The motivational aspect of credit for basic skills courses seems to have an impact on performance in those courses This, too, is an area where further research might be profitable

7. **Research on developmental education appears to be conducted as often in 2-year institutions as in 4-year institutions.**

Although community college programs were frequently criticized for their failure to assess developmental education activities in the late 1960's and early 1970's, they appear to have been more active in the area of program assessment in the late 1970's and early 1980's. At least they have been as active as four year colleges and universities have been during this period. Of the reports reviewed in this study, twenty-three were based on community or technical college populations and twenty were based on populations of four year institutions. There appears to be as much evaluation and research on the topic of developmental education in community colleges as there is in four year institutions. This is in spite of the fact that four year institutions are presumed to be more "research oriented" than community and technical colleges. Apparently, insofar as developmental education activities are concerned, this presumption is not, necessarily, an accurate one.

In reviewing recent research and evaluation efforts in developmental education, it was gratifying to note that the quality and quantity of these efforts seems to have increased since 1975. As early research studies showed ambiguous results based on inadequate or inappropriate data, leaders in the field began to call for better and more frequent evaluation efforts in developmental education. This call was matched by demands from legislators and educational administrators for developmental programs to document the outcomes of their activities.

Apparently, these calls were heeded by practitioners in the field. More research is now available to support the effectiveness of developmental education activities and much of the research is better designed than in the past. As K. Patricia Cross has pointed out (1976, p. 36), "By the early 1970's those responsible for remedial programs were able to get down to the hard work of seeking new and better alternatives ... both the design and the evaluation of remedial programs have improved substantially in the 1970's." All of us in the field of developmental education are indebted to those responsible for this increased and improved research and evaluation activity. It has helped to build a strong case for the effectiveness of developmental education in accomplishing some of the most critical missions in contemporary postsecondary education.

CHAPTER V

FUTURE RESEARCH AND EVALUATION ISSUES

Practically every research study undertaken concludes with a call for more research This study is no exception In reviewing previous research efforts, shortcomings of existing research or gaps in the available knowledge become apparent. As the field of developmental education grows and undergoes various transition, it will become increasingly important to overcome these shortcomings and fill the gaps in our knowledge

It will be the responsibility of practitioners in the field, researchers on college and university campuses and graduate students throughout the country to carry on the research efforts of the past and to advance the knowledge in the field for future practitioners For those who are interested in accepting this challenge, the following suggestion are offered for further research efforts

Component Analysis

The research to date suggests that those programs with the most comprehensive battery of services are more likely to produce gains in test scores, GPA, and retention than those with more limited services It is reasonable to assume that some developmental services account for a larger part of this gain than others. As resources for developmental education stabilize, it will be beneficial to understand which program components are the most important contributors to student success By emphasizing those components which have the greatest impact and de-emphasizing those components which have the least impact, developmental programs can continue to serve students well and do so in a more cost-effective manner

Suen (1979) has proposed a model that has great potential for accomplishing this component analysis Researchers are encouraged to implement this model in reviewing other developmental programs in an effort to add to our knowledge of why and how developmental education works

Criterion-Referenced versus Norm-Referenced Measurement

Postsecondary educators have long been enamored with standardized, norm-referenced tests of student achievement Such measures are designed to describe a student's performance in relationship to all other students who took that particular test Criterion-referenced measures, on the other hand, " assess student achievement in terms of a criterion standard thus (providing) information as to the degree of competence attained by a particular student which is independent of reference to the performance of others" (Glaser, 1971, p 8) In other words, criterion-referenced measures are keyed directly to performance according to specific learning objectives In cases where these objectives are matched to the actual skills required for success in a given curriculum, it is quite possible that criterion-referenced testing would be a far better predictor of later student performance than norm-referenced testing

This possibility provides a valuable area for future inquiry If criterion-referenced tests serve as better indicators of actual student performance then they will add substantially to our ability to assess developmental students Furthermore, since such tests are keyed to learning objectives, they will also provide an excellent source of diagnostic information The increased use of criterion-referenced tests may, therefore, not only improve our assessment and diagnostic capacity, since they are, by definition developed locally but they may also reduce the costs of assessment and diagnosis by reducing the need to purchase commercially developed instruments

This is not to say that standardized, norm-referenced tests will not be necessary They will still serve a valuable function in the assessment and placement of students Criterion-referenced tests do, however, have the capacity to improve diagnosis while reducing costs It remains for future researchers to determine the potential merit of criterion-referenced testing in developmental education -- particularly insofar as their predictive validity when compared to norm-referenced measures are concerned

Follow-up Performance of Post-Developmental Students

While a great deal of research effort has been directed to

assessing the immediate gains of students who participate in developmental programs and long term retention of such students. little is known about other possible effects of developmental education Some studies have investigated the performance of developmental students in regular English or mathematics courses following participation in basic skills courses in these subjects While the results tend to favor post-developmental students as opposed to those who have not participated in a developmental program, the evidence is not entirely clear cut Additional research information will be necessary before broad generalizations can be made regarding this issue

Other long term effects of developmental education are also worthy of further study How does participation in a developmental program affect s ection of majors? How well do post-developmental students perform in careers following graduation when compared to non-developmental students? Do developmental students display improved academic behavior such as regular class attendance punctuality in returning assignments, consistency in doing outside readings, or more realistic selection of courses? To what degree are post-developmental students active in campus activities or student affairs following their participation in developmental programs? How do they compare in this regard with non-developmental students? The answers to these and other questions will serve to improve our understanding of the developmental student and our capacity to meet that student s needs

Cost-Effectiveness of Developmental Programs

Developmental programs are often criticized because they utilize resources in serving high risk students that could be applied to other endeavors that would benefit all students They are also criticized because they use college level resources to resolve problems that in the minds of many, should have been corrected in elementary or secondary schools

There is some likelihood, however, that a carefully planned and well-managed developmental program is actually a very low-cost operation -- particularly when compared to other campus units Models for assessing the cost-benefits of developmental programs have been proposed by Boylan (1978) and O'Hear and Pherson (1982) Using his model as a consultant to the developmental

programs at Rowan Technical College in North Carolina and West Virginia State College. Boylan found that the money spent on developmental education at these institutions was substantially offset by resulting cost-benefits in the areas of retention and full-time equivalent subsidies as well as additional tuition payments and longer residential occupancy for students who might otherwise have been lost

The cost-effectiveness in developmental education is and will be an increasingly important issue It will be necessary for practitioners in the field to determine what it actually costs to run a developmental program, what the cost-per-student is of providing developmental services, and what benefits accrue to institutions as a result of developmental education activities Assessment of these factors is a fertile ground for future research and one that will be important to the long-term viability of developmental education

The Utility of Developmental Education for All Students

While the field of developmental education is relatively new, the methodology employed in most programs has its roots in theories of learning that have been available for decades Essentially, most developmental education programs simply employ sound educational practices that have been utilized for years by successful instructors Consequently, there is probably a great deal of truth in the often repeated statement that developmental education can be beneficial for all students, not just those who are underprepared Yet, practically all research on developmental education is based on underprepared students Control groups and experimental groups in developmental education research are usually selected from among those who present the poorest admissions credentials

More studies are needed using additional control groups of better prepared students who are participants and non-participants in developmental programs More information is needed about the effects of developmental education activities on those students who appear to have the prerequisite skills necessary for college success

In the long run, the future of developmental education may well be decided by the field's success in promoting academic and personal development for all students -- not just the most poorly

prepared students Research to support the effectiveness of developmental services for better prepared students, therefore, can be vitally important

Competencies Necessary to Developmental Educators

Since developmental education is a relatively young specialty in postsecondary education, a consensus on the skills and competencies necessary to the successful developmental educator is still emerging Several efforts have been made to identify these skills and competencies Among the more notable are those of Maxwell (1979), Roueche and Thompson (1980), and Dickens (1980) Follow-up efforts are necessary to provide a basis for the training of future developmental educators, the development of graduate and in-service training programs, and the assessment and certification of developmental programs

Christ and Coda-Messerle (1981, p 102) correctly note that "As college administrators look ahead to the challenges of a changing student population and an increasingly complex informational and technical world for which they must prepare their students, training programs become more and more the answer for managerial efficiency, cost effectiveness and learner satisfaction " The nature and composition of such training programs can best be determined by additional research on the skills and competencies necessary to the successful practice of developmental education

Student Learning Styles and Treatment

One of the more recent trends in developmental education practice has been the assessment of student learning styles Educators have known for decades that different students learn in different ways The work of Canfield (1976), McCarthy (1980), and Myers (1980) has contributed greatly to our ability to assess the differences in the ways students learn and our capacity to use the results of this assessment in a productive manner

Nevertheless, the practice of learning styles assessment and the design of instructional responses to assessment results is still in relative infancy We need to know more about the learning styles of developmental students and the ways in which developmental educators can respond to these learning styles We need to know

more about the utility of various instruments for assessing the learning styles of developmental students Perhaps most of all, we need to know which techniques for accommodating individual differences in learning produce the best results These are not easy questions to answer through research but the answers, when found will provide a basis for vastly improved learning among developmental as well as all other students in postsecondary education If a "quantum leap" in our capacity to promote learning is to take place, it may very well come from improved understanding of individual learning styles and their implications for instruction

Reasoning Skills and the Developmental Student

Another recent trend in developmental education is the provision of courses or other instruction in reasoning and critical thinking An increasing amount of literature on the importance of reasoning skills for developmental students is beginning to appear and more programs are beginning to include reasoning skill development as a part of their curriculum In fact, interest in reasoning skills development has lead to the formation of a "Special Interest Group" on reasoning skills by the National Association for Remedial/ Developmental Studies in Postsecondary Education

One of the leaders in the reasoning skills movement among developmental educators, Curtis Miles, has proposed (1978, p 22) that instruction in any discipline relies on the quality of students ability to reason and that "Students who are weaker than need be in their reasoning abilities are crippled when trying to learn or practice anything else " While neither Miles nor anyone else proposes that the teaching of reasoning skills will provide a panacea for the problems of the underprepared learner, this approach does have considerable potential for improving students' learning skills Unfortunately, research on the effect of reasoning skills training for underprepared students is, as yet, limited Additional research in this area may well provide important information for improving the practice of developmental education

CONCLUSION

No one has ever claimed that the practice of developmental education would be easy The developmental educator works with some of the most difficult clients in postsecondary education And he does this work with limited resources, little support, and even less recognition

In many cases, developmental educators are among the most poorly paid professionals at their institutions Yet they do a job that no one else wants to do and manage to obtain results that few others care about And, in addition to everything else, they are frequently accused of being ineffective in accomplishing their basic mission of helping underprepared students to be successful in college

If nothing else, perhaps the research results reported in this study will help to alleviate the latter situation The available research and evaluation information from programs across the United States suggests that developmental programs do help students to improve their basic skills, obtain higher grades, and persist in their academic careers This is not an insignificant accomplishment

The practice of developmental education may be a humble profession in academe but those who practice it do it well They also do it with a commitment to excellence and a commitment to the egalitarian philosophy of the "open door" to educational opportunity

As John Gardner has so eloquently pointed out (1961, p 86) "An excellent plumber is infinitely more admirable than an incompetent philosopher The society which scorns excellence in plumbing because plumbing is a humble activity and tolerates shoddiness in philosophy because philosophy is an exalted activity will have neither good plumbing nor good philosophy Neither its pipes nor its theories will hold water "

Developmental educators seem to exemplify this statement They work with the most humble of students but they encourage excellence in those students And in an academic arena where research grants and scholarship are exalted, the practice of developmental education is a humble profession Yet the research suggests that developmental educators do their jobs well in most

cases and, given the material with which they have to work and the results they are able to achieve, their efforts certainly represent excellence in postsecondary education Developmental educators may, indeed, be looked upon by their colleagues in more traditional disciplines as the 'plumbers' of postsecondary education There is, however, ample evidence to suggest that they are excellent plumbers One is tempted to ask those who consider themselves to be the 'philosophers' of postsecondary education if they can demonstrate through research and evaluation that they do their jobs as well as developmental educators do theirs

REFERENCES

Allarie, S. Course and Program Development Department Report on LITERACY 1977-78 Office of Course and Program Development Edmonton, Canada Grant MacEwan Community College

Appel, V. H. and others. Impact of Administrative Climate, Instruction and Counseling on Control Expectancy, Anxiety and Completion Rate of Postsecondary Educationally Disadvantaged and Minority Vocational/Technical Students Final Report Austin University of Texas, Department of Educational Administration, 1977

Astin, A. W. *Preventing Students from Dropping Out* San Francisco Jossey-Bass, 1975

Astin, A. W. *Four Critical Years Effects of College on Beliefs, Attitude and Knowledge* San Francisco Jossey-Bass, 1977

Beliucci, B. N. 'Report on the Evaluation of Developmental Education ' Unpublished consulting report Wilkes-Barre, PA Kings College, June 1981

Bojar, K. Beyond the Basics The Humanities in the Developmental Curriculum ' *Journal of Developmental & Remedial Education*, Winter 1983, 6(3) 18-21

Boylan, H. R. The Impact of Personalized Instruction on Developmental Students ' Paper presented to the International Congress on Individualized Instruction Boston October 1977

Boylan, H. R. Assessing Cost-Benefits and Cost-Effectiveness for Learning Centers Paper presented to the American College Personnel Association Convention Los Angeles CA March 1978

Boylan, H. R. Student Development Program Evaluation Report Bowling Green DH Student Development Program Bowling Green State University 1979

Broadbent, W. Leeward Community College Developmental Education Study " Honolulu HA Leeward Community College Developmental Education Program, 1977

Burgess, B. A and others. Effect on Academic Achievement of a Voluntary Reading Program *Journal of Reading* 1976 19 644-646

Brown, Burton B. Personalized Learning Center University of Florida In Donovan R (Ed) *Report of National Project II Alternatives to the Revolving Door* New York Bronx Community College 1975 pp 46-50

Bureau of Higher Education Opportunity Programs. *Higher Education Opportunity Program Annual Report 1979-80* Albany NY The University of the State of New York Bureau of Higher Education Opportunity Programs 1970

Bureau of Higher Education Opportunity Programs. *Higher Education Opportunity Program Annual Report 1980-81* Albany NY The University of the State of New York Bureau of Higher Education Opportunity Programs 1981

Canfield, A. *Learning Styles Inventory* Northville MI Humanics Media Inc 1976

Carnegie Council on Policy Studies in Higher Education *Three Thousand Futures The Next Twenty Years for Higher Education* San Francisco Jossey-Bass 1980

Carter, L. G. *Developmental Studies Project Final Report* Canandaigua NY Community College of the Finger Lakes 1976

Cashen, C J. Fillippone, S R and Gajewski, G C. From Basic to Collegiate Skills *Journal of Developmental & Remedial Education* Winter 1981 9(2) 22-24

Christ, F and Coda-Messerle, M Staff Development for Learning Support Systems *New Directions in College Learning Assistance* 1981 (4) San Francisco Jossey-Bass

Cross, P. K. *Beyond the Open Door* San Francisco Jossey-Bass 1974

Cross, P. K *Accent on Learning* San Francisco Jossey-Bass 1976

Dickens, M. E Practitioners Formulate Competencies for Developmental Educators *Journal of Developmental & Remedial Education* Fall 1980 4(1) 16-17

Donovan, R. A *National Project II Alternatives to the Revolving Door* New York Networks Bronx Community College 1975

Drinkell, S and Hemmingway, B. Final Report LITERACY 82 Student Study Services Edmonton Canada Grant MacEwan Community College 1982

Farkas, F A ACT 101 Final Report La Plume PA Developmental Education Department Keystone Community College 1982

Franco, A Educational Opportunity Program California State University Fullerton In Donovan R (Ed) *Report of National Project II Alternatives to the Revolving Door* New York Bronx Community College 1975 pp 6-9

Gardner, J *Excellence Can We Be Equal and Excellent Too?* New York Harper & Row 1961

Glaser, R Instructional Technology and the Measurement of Learning Outcomes In James Popham (Ed) *Criterion Referenced Measurement An Introduction* Englewood Cliffs NJ Instructional Technology Publications 1971

Haburton, E Impact of an Experimental Reading-Study Skills Course on High Risk Student Success in a Community College In P D Pearson and J Hanson (Ed) *Reading Theory Research and Practice* Twenty-sixty Yearbook Clemson SC National Reading Conference 1977

Helm, P K and Chand, S. Student Success at Triton College In John E Roueche (Ed) *New Directions for College Learning Assistance* San Francisco Jossey-Bass 1983

Hoeber, M K and Hoeber, D R *Basic Skills Programs Are They Working?* AAHE-ERIC Higher Education Research Report No 1 Washington DC American Association of Higher Education 1978

Jencks, C. and Riesman, D. *The Academic Revolution* Garden City NY Doubleday and Co 1968

Kinnebrew, E L Project 30 An Evaluation and Review Sacramento CA Project 30 Sacramento City College 1975

LePage, H L. and Zachel, G O Survey of Middle-Size Institutions in Selected Midwestern States Learning Centers in Higher Education Report No 1 La Crosse WI American Personnel & Guidance Association Commission XVI 1978

Ludwig, L and Gold, B K The Developmental Studies and Tutorial Programs Progress Report Los Angeles Developmental Studies Program Los Angeles City College 1969

MacMillan, T F and Kesler, D M *Promises to Keep* NORCAL Impact on Student Attrition *Community and Junior College Journal* February 1973 43 45-46

Martin, D. C and Blanc, R The Learning Center's Role in Retention Integrating Student Support Services with Departmental Instruction *Journal of Developmental & Remedial Education* Spring 1981 4(3) 2-4

Maxwell, M *Improving Student Learning Skills* San Francisco Jossey Bass 1979

McCarthy, B. *The 4MAT System Teaching to Learning Styles with Right Left Mode Techniques* Oak Brook IL Excel Inc 1980

Miles, C. Reasoning The Fourth R *Journal of Developmental & Remedial Education* Fall 1978 2(1) 22-24

Moore, C. A. Teaching Writing to the Underprepared The Three R s' Paper presented at the Annual Meeting of the Conference on English Education, Knoxville, TN March 24-26 1977

Myers, I. B. *Gifts Differing* Palo Alto CA Consulting Psychologists Press, 1980

(The) New York State Education Department. *The Effectiveness of Post-secondary Opportunity Programs for the Disadvantaged* Albany NY The University of the State of New York State Education Department, 1975

O'Hear, M. F. and Pherson, V. E. Computer-Generated Evaluation in Developmental Programs *Journal of Developmental & Remedial Education*, Fall, 1982, 6(1) 20 23

Peck, A. and others. Providing Something for Everyone Through the Learning Center *Journal of Developmental & Remedial Education* Fall 1981 5(1) 15-18

Rachavong, D. A Report on the Freshman Basic Studies Program Charleston, WV Title III Program West Virginia State College 1979

Raygor, A. L. and others. 1973 Review of Research in College-Adult Reading *23rd Yearbook of the National Reading Conference*, 1973

Roueche, J. E. The Open-Door College The Problem of the Low Achiever *Journal of Higher Education* November 1968 39 453-456

Roueche, J. R. and Wheeler, C. L. Instructional Procedures for the Disadvantaged *Improving College and University Teaching* Summer 1973 21 222-225

Roueche, J. E. and Kirk, R. W. *Catching Up Remedial Education* San Francisco Jossey-Bass 1974

Roueche, J. E. and Snow, J. *Overcoming Learning Problems* San Francisco Jossey-Bass 1977

Roueche, J. E. and Thompson, C. Good Teaching Promotes Student Success *Journal of Developmental & Remedial Education* Spring 1980 3(1) 12-14

Santeusanio, R. P. Do College Reading Programs Serve Their Purpose *Reading World* 1974 13 258-271

Shelton, R. Learning and Study Skills Department Yearly Report Fall Spring, 1982 Greenwood SC Learning and Study Skills Department Piedmont Technical College 1982

Snyder, F. and Blocker, C. F. Persistence of Developmental Students Harrisburg PA Developmental Studies Program Harrisburg Area Community College 1970

Starks, G. and Kuznik Effects of a Reading and Study Skills Program on Academic Performance and Retention in a Technical College In Joseph Fisher (Ed) *North Central College Reading Association 10th Annual Yearbook College and Adult Reading* Des Moines IA Drake University 1980 46-55

Starks, G Community College Retention in the 70 s and 80 s Reasons for Withdrawal and Effects of Remedial and Developmental Programs Unpublished manuscript 1982

Suen, H. Special Services Evaluation *Journal of Developmental & Remedial Education* Fall 1979 3(1)

Summers, E. G. Doctoral Dissertations in College Reading *Journal of Reading* October 1979 24 9 14

Supplementary Education Program. Remedial Program Evaluation for 1981-82 Winston-Salem State University Winston-Salem NC Supplementary Education Program 1982

Sutherland, B. J. and Sutherland, D. Read Writers A Sensible Approach to Instruction *Journal of Developmental & Remedial Education* Fall 1982 Volume 6 Number 1 2-6

Swindling, J. Data-Based Evaluation of a Reading Program *Journal of Developmental & Remedial Education* 5 1Special Issue1 20-22

Thompson, M. E. A Review of Significant Studies with High Risk Students Remediation for College Students Paper presented to the Annual Meeting of the North Central Reading Association October 1977

Tilman, C. E. Four Year College Reading Programs and Grades An Annotated Review 1945-71 *Journal of Reading Behavior* SPring 1973 5 100-109

Turne, C. S. and others. The Effects of a Developmental Program on University Grades *Journal of Reading* 1974 17 531-537

Whimbey, A., Boylan, H and Burke, R. Cognitive Skill-Oriented PSI for Developmental Students *Journal of Developmental & Remedial Education* Fall 1979 1(4) 7-17

52

APPENDIX I

Institutions from which Data was Reported in this Study

American River College. Sacramento. CA
Bowling Green State University. Bowling Green. OH
California State University. Fullerton. CA
Community College of the Finger Lakes. Canandaigua. NY
Dallas County Community College System. Dallas. TX
Eastfield College. Mesquite. TX
El Paso Community College. El Paso. TX
Forest Park Community College. St Louis. MO
University of Florida. Gainesville. FL
University of Georgia. Athens. GA
Glendale Community College. Glendale. CA
Grant MacEwan Community College. Edmonton. Alberta CA
Gulf Coast Community College. Panama City. FL
Harrisburg Area Community College. Harrisburg. PA
Higher Education Opportunity Programs. State of New York
Keystone Junior College. La Plume. PA
Leeward Community College. Honolulu. HA
Los Angeles City College. Los Angeles. CA
University of Minnesota Technical College. Crookston. MI
University of Missouri. Kansas City. MO
Mid-America Nazarene College. Olathe. KS
Mohegan Community College. Norwich. CN
Mount Hood Community College. Gresham. OR
Community College of Philadelphia. Philadelphia. PA
Piedmont Technical College. Greenwood. SC
Pierce Junior College. Philadelphia. PA
Pikeville College. Pikeville. KY
Sacramento City College. Sacramento. CA
Triton College. River Grove IL

West Virginia State College. Charleston. WV
University of Wisconsin - La Crosse. La Crosse. WI
University of Wisconsin - Oshkosh. Oshkosh. WI
University of Wisconsin - Parkside. Parkside. WI
Winston-Salem State University. Winston-Salem. NC

Number of program reports reviewed
from postsecondary institutions = 34

APPENDIX II

Characteristics of the Studies Reviewed

Number of studies from community and junior colleges	21
Number of studies from two-year technical colleges	2
Number of studies from public colleges or universities	17
Number of studies from private four-year colleges	3
Number of states represented in this study	19
Number of gain score studies reviewed	10
Number of GPA studies reviewed	14
Number of retention studies reviewed	14
Number of miscellaneous studies reviewed	5