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A STUDY OF EFFECTS OF PERSISTENCE AND NONPERSISTENCE IN
MASTERY LEARNING PSI REMEDIAL ENGLISH IN A TWO-YEAR COLLEGE

by

John H. Corbin

A Dissertation
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A STUDY OF EFFECTS OF PERSISTENCE AND NONPERSISTENCE IN MASTERY LEARNING PSI REMEDIAL ENGLISH IN A TWO-YEAR COLLEGE

John H. Corbin, Ed.D
Western Michigan University, 1985

This study examines students with diagnosed writing deficiencies who persisted (Group I, n=350) and provided evidence of mastery of the subject matter in a "Mastery Learning" remedial English course designed after the Keller plan of Personalized System of Instruction (PSI) at Kalamazoo Valley Community College. Their subsequent achievement on three criterion variables—Grade in Freshman Writing, Total Credit Hours Earned over a Two Year Period, and Overall Grade Point Average—is compared with achievement of three other groups. Group I (Placed Out, n=84) consists of students with superior placement test scores who enrolled in Freshman Writing without remedial instruction; Group IV (Opted Out, n=34) consists of students with unsatisfactory placement exam scores but who also opted to attempt Freshman Writing without remedial instruction; finally, Group III (n=312) consists of students with diagnosed writing deficiencies who enrolled in the remedial English course but who quit before demonstrating mastery of the subject matter.

Demographic data were gathered on all 780 subjects in addition to placement exam scores and achievement measures. Two-way ANOVA tables were generated to analyze effects of combinations of independent variables on the three criterion variables, and step-wise multiple regression formulas were produced to analyze the extent of contribution various independent variables made on the dependent variables.
Statistically significant differences were observed between persisters and nonpersisters on all criterion variables. Persisters were found to perform on a par with students in Group I and to outperform students of Group IV although to only a small extent. Persistence in the remedial English course was found to be a powerful predictor of success in subsequent achievement at Kalamazoo Valley Community College; nonpersistence, an equally powerful predictor of failure. Even though conclusions about the effects of mastery learning remedial English are tentative because of the unknown extent of influence of such unmeasured and nonintellectual characteristics as students' motivation and drive, positive evidence of the effects of the method does appear in the study. Such evidence justifies recommendations that a more dynamic orientation be set in place to help those with nonpersistence traits toward stronger goal setting behaviors. Further course design efforts need to be expended to determine what if any modifications need to be made in the units of the program that students first encounter that may lead to their nonpersistence. Finally, the administration of Kalamazoo Valley Community College should be encouraged to support further research to discover traits shared by the nonpersisting population to determine if noncognitive, affective programs might be designed to increase that population's persistence.
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Western Michigan University

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ACKNOWLEDGEMENTS

The production of a dissertation, especially its final stage, the conventional "Acknowledgments," is like arriving at a landmark on a journey. The convention demands reflection. The traveler, the scholar perforce reflects: on origins and destinations, on passages, and most importantly on people, perhaps hundreds, who shared the journey at different times and in different places. Vaguely I recall a gentle children's librarian seating me at a round, brightly-colored table and offering me an endless array of brightly-colored books. Possibly that was the beginning of a journey that has led to the present occasion.

Clearer recollection brings to mind specific names although forgotten faces—Mrs. Barker, Miss Hanson, Mrs. Miller, Miss Donnelson—whom I joined for a time, and then our paths diverged. Along the way there were times when I got mired, and a friendly reference librarian would set me on my path. In most recent years Committee Chair Dr. Kenneth Dickie, and Members Dr. Robert Brinkerhoff, and Dr. Howard Poole have shared their knowledge and experience and helped me in countless ways to direct my steps toward this milestone.

There is no way to acknowledge all of the individuals to whom I owe gratitude; but in the broadest sense, the people of the State of Michigan have acted through thousands of agents to provide endless educational opportunities for me and other nontraditional students to develop our intellectual capabilities to the limits of our ambition and energies. My debt to the People of the State of Michigan obliges me to
use my skills and energies to provide for others the kinds of opportunities made available to me. I hereby acknowledge that debt and commit my career to its repayment.

John H. Corbin
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CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Background of the Problem

Nontraditional Students As a Population

For a variety of reasons—social, economic, historical, and political—access to higher education has become an expectation of an increasingly wider spectrum of American society. The phenomenon has led to the coining of a new term in the educational lexicon, "the nontraditional student." This new term, which officially entered the ERIC Thesaurus in 1977, implies the existence of a "traditional" student typically conceived of as the offspring of the middle and upper socio-economic classes in their late teens and early twenties who attend college for four years before entering graduate studies or a career. Nontraditional students, on the other hand, are so diverse as to defy characterization: in effect, they consist of all who are not "traditional" students—older adults, ethnic minorities, women with dependent children, underprepared students, and other special groups typically underrepresented in higher education and who enter and exit higher education at different life stages for a multitude of purposes—career preparation, career changes, personal enrichment, or simple exploration. Their presence on the scene poses a dilemma for higher education as a social institution. On one level American
higher education espouses the ideals of an egalitarian society. Gould and Cross (1972) in the Prologue to *Explorations in Non-Traditional Study*, a report of the Commission on Non-Traditional Study, articulated that democratic ideal as the availability of equal educational opportunity to "each individual, regardless of age, previous formal education, or circumstances of life that will add to and develop his potential as a person" (p.3). This ideal, they argued, is undermined by conditions existing in traditional higher education that systematically exclude persons who fall outside the definition of traditional students. Gould and Cross observe that "elements of structure, method, content, and procedures" make higher education inaccessible to many.

On another level, one might argue, American colleges and universities have established challenging standards of achievement and attracted students who not only met the standards but also brought with them the ability to cope with the rigor and discipline of college life. The fact that these students represented a narrow spectrum of American society would rarely be viewed as a manifestation of elitism: the dominant attitude seemed somewhat benign and was expressed in vaguely nonjudgmental terms that simply observed that university level work was not for everyone; but if one wanted to reap the rewards of higher education, one presented himself to the university with appropriate skill levels and desire to learn and the university would perform its function without regard to the candidate's circumstances of life. Cross (1971) puts the problem into perspective with her analysis of the shifts in philosophy that have occurred during this
century. She defined three philosophies—aristocratic, meritocratic, and egalitarian—that characterize the transition. The aristocratic philosophy said that white males of the upper socioeconomic class should attend college; the meritocratic philosophy bases college admission solely on ability; and the egalitarian philosophy "means that everyone should have equality of access to educational opportunities regardless of socioeconomic background, race, sex, or ability" (p. 6).

Indeed, higher education traditionally provided the vehicle by which talented young persons of the lower and working classes escaped their origins; but that vehicle had few seats in the past and costs were prohibitive. Few accommodations were made for those who did not acquire the dominant culture's image of the traditional student.

Response of Higher Education to the Nontraditional Student

New Structures in the University

With the return of the veterans of World War II financed by the G.I. Bill, the image was temporarily abandoned until the veterans picked up the pieces of their lives. By then, however, colleges had become accustomed to a new type of student body—older, male, socially more heterogeneous, and in a hurry to start a career. Cohen and Brawer (1982) cite data from the U.S. Department of Health, Education, and Welfare that show the increase in college-age adults who enrolled in college prior to and immediately after World War II. Approximately six percent or 1.4 million of the 24 million college-age adults enrolled prior to the war; after the war over 14 percent or 2.3
million enrolled of a population of 16 million. Higher education made accommodations in every aspect to bring this new population under its umbrella: Quanset huts were erected to meet the housing and classroom needs of this new student body, testing and counseling centers were established, programs were designed to orient the new population to college life.

The Community/Junior College Movement

When the Civil Rights movement of the 1960's began to raise the expectations of minorities, higher education already had some structures in place to meet the needs of new populations; but more importantly, the community/junior college movement had begun to develop momentum. Between 1970 and 1977 community/junior colleges led the growth in enrollment with a 58 percent increase causing a general shift in enrollment patterns. Community/junior colleges reaped a 6.08 percent increase in the share of enrollment almost entirely at the expense of all four-year colleges (Frances, 1980).

Huge campuses were planted in the hearts of metropolitan areas providing convenient and economical access to thousands of new constituents. Hundreds of new community/junior colleges sprouted where formerly corn fields and orchards stood. Many of these colleges began to offer a variety of nontraditional courses and services including placement testing; academic and personal counseling; day care centers; financial aid in the forms of grants, low interest loans, and work study programs; and remedial instruction in basic skills. The success of higher education to attract nontraditional students is attested to
by the fact that only 47 percent of the 1980-81 college students fell within the 18 to 21 age group, that is, the traditional college-age group (Frances, 1980). American higher education showed little concern for the inroads that community/junior colleges made into the market; there were plenty of students to go around, and high attrition rates were acceptable side effects of high standards. Motivated, according to Roueche and Snow (1977), more by laws of supply and demand than by egalitarian principles, universities began to liberalize entrance requirements to some extent to accommodate nontraditional students. Competent students coped and survived despite barriers posed by the system, and those who did not survive were either readily absorbed into the industrial based economy or given repeated opportunities through available community/junior colleges. Society was willing to accept those conditions. The 1970's, however, saw major changes in society's outlook which was brought on by more forces than can be adequately developed in this context; however, two major forces were the shrinking birth rates and the gradual shift in the American economy from industrially-based to information and service based. American higher education was left with the aspirations of society and an inflated capacity to meet those expectations, albeit under drastically altered conditions.

The shrinking pool of traditional college students resulted in the grudging acknowledgement that American higher education would be increasingly required to educate students ill-prepared for the discipline and expectations of higher education. Roueche and Snow (1977) observed that community/junior colleges accepted the major respon-
sibility for preparing nontraditional students for college life, and even they have spotty records of success. Many, they claim, have open door policies which have been characterized as revolving doors: nontraditional students can expect no greater odds for success in such community/junior colleges than in the universities. Choices of curricula are limited to traditional offerings, and marginal students can expect no "complete, well-conceived, well-designed program" (p. 6). Moore (1970) expressed the paradox faced by community/junior colleges: Their open door admissions policies hold out an invitation to college students "who would otherwise be economically, socially, and academically alienated from higher education" (p. 14). The door is open, but nontraditional students typically lack entry level skills to take advantage of the opportunities. From a perspective ten years advanced from that of Moore, on the other hand, Roueche and Mink (1980) are convinced that the community/junior college will become the college of diversity. "It is the institution to which the poor, the dissatisfied, the hard core 'losers' will turn for aid in exploring the options that will give them a better chance of survival in an increasingly complex world" (p. 3).

Adult Remedial Education

While many community/junior colleges view themselves as the first two years of the university system, others, responding to their communities' aspirations have organized themselves to provide their student bodies with services designed and delivered in ways so as to compensate for their students' circumstances. They expect the effects

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of their students' nontraditional status to be offset by such educational innovations as cognitive skills mapping, placement testing, personal and academic counseling, financial aid, and remedial instruction delivered in a variety of student-friendly modes. The extent to which this attitude flourished can be measured by the number of colleges which began granting degree credit for remedial work: In 1970 32 percent of the nation's community/junior colleges offered such credit; in 1975, 58 percent, and in 1977, 78 percent. Such services are costly, however, and colleges cannot afford to offer programs for the less qualified who have failed to exploit advantages offered in the previous twelve years (Cohen & Brawer, 1982). A shrinking economy causes some to claim that resources might be more judiciously devoted to students whose likelihood of success is greatest. Furthermore, they make demands on traditional curriculum and course designers for which most are unprepared. Roueche and Snow (1977) observed the willingness and ability of community/junior colleges to offer innovations attractive to and effective with nontraditional students. Further, they found that the elements of these innovative approaches were "associated with high-risk student success in community colleges," more so than in senior colleges (p. 34).

Gagne' (1970) asks how such students can be motivated to begin and continue learning, how the direction of their interests and efforts can be guided, and what can be done to assess the outcomes of learning—questions independent of content and conditions of learning but answered by reference to systems of management of learning. Cross (1978) argued in her appearance before the Conference on Education in...
the Community College for the Non-Traditional Student that the most promising method lay in the Mastery Learning model, in which students' learning is measured in amounts of learning mastered rather than in time spent with the system.

**Failure of the Nontraditional Student**

Sikula (1979) described the effects of no remedial treatment at all for underprepared students. The failure rate among a group of older adult students defined as underprepared enrolled at a branch of Indiana University was 75 percent. Only one student in four earned a "C" average at the end of one year's study at the freshman level. As a result of her study, Sikula recommended that Indiana University not commit resources to remedial instruction: it should be offered elsewhere to avoid duplication of services and waste of scarce resources.

In two studies on the effects of adult remedial education Roueche and Mink (1980) and Roueche and Snow (1977) projected a gloomy scenario for the 1980's based on existing demographic data. Observing that the total pool of traditional college freshmen will diminish by 2.4 million by 1990, the authors concluded that colleges will be forced to dip deeper into the pool to fill their classes. Even the current "cream of the crop," they discovered, "[had] severe communication problems, both verbal and nonverbal. A large percentage . . . cannot read, write, figure, or think well enough to succeed in traditional freshman courses" (p. 4). To illustrate the problem that was already evident in 1979, Roueche and Mink cited the experience of an admissions office at "a large [unnamed] state university" which
discovered that 500 of its 2,000 entering freshmen were predicted to earn less than a "C" average at the end of one year. The authors noted that other colleges had attrition rates, predicted and real, exceeding 50 percent. If the "cream of the crop" is expected to flunk out at a rate from 25 to 50 percent, and if the normal attrition rate among diagnosed underprepared students is 75 percent, then it is clear that higher education will have to make further dramatic changes to confront the problems of increased diversity which Roueche and Mink (1980) identify as the major cause of the attrition trends. Furthermore, the supply-demand situation of these trends leads to the conclusion that failure to provide remedial treatment will produce attrition rates that legislatures and parents will not accept.

**Mastery Learning**

Probably the core question to be answered about adult remedial education is "Does it really make any difference?" Do students with the worst of the worst disadvantages who make connection with an adult remedial education program with the best of the best features really improve their chances of acquiring the benefits of higher education? If in the absence of adult remedial education predicts unacceptable failure rates, is there any support for the idea that its presence improves the odds for success? It is this issue that Bloom (1973, 1976, 1981) and Carroll (1963) address in the development of the concept of "Mastery Learning." These authors cite research that allows them to conclude that 95 percent of all learners can achieve mastery of any body of subject matter provided the following five
conditions exist:

(a) the learners devote the amount of time required to master the material, i.e., possess the aptitude;

(b) the material is presented, explained, and the elements of the task to be learned are ordered in such a way "as to approach the optimum" for each learner;

(c) the learners understand the nature of the task to be learned and the procedures to be followed in learning the task;

(d) the learners are willing to devote the time necessary to learn the material, i.e., possess the affective characteristics required to persevere; and

(e) the system will allow the time necessary for learners to learn the subject matter.

In a 1973 publication Roueche and Kirk claimed that remedial mastery learning programs in operation at six community colleges in Texas produced statistically significant differences in two measurements, GPA and persistence into third semester, between students who enrolled in remedial programs and students who chose not to enroll. The authors claimed that the remedial programs resulted in higher persistence rates and successive year grade improvement; that is, the 1970-71 year group outperformed their predecessors. The authors reported as evidence of the programs' successes that 35 percent of the 1969-70 group completed two years of study. The disparity between the theoretical 95 percent suggested by Bloom and Carroll and the observed 35 percent from the study has to be striking even to a casual observer and does not appear to improve the odds substantially as observed by
Furthermore, the authors reported that only two of the subjects earned better than a D grade in regular, nonremedial course work following their remedial experiences. The study lends little support to the notion that remedial education provides any payoff for the underprepared student, but it does represent an early attempt to verify the results of adult remedial education programs.

In a document entitled "Time As the Variable, Achievement As the Constant: Competency-Based Instruction in the Community College", Roueche and others (1977) proposed a Mastery Learning model based on principles derived from Bloom and Carroll's second condition. Five features listed in the Roueche model include:

(a) analysis of course requirements,
(b) specifications of objectives,
(c) preparation of instruction,
(d) presentation of instruction, and
(e) evaluation and validation.

Roueche and Mink (1980) argue that well-designed, "comprehensive adult remedial education programs" should improve the chances for success of high risk students. They claim that direct treatment of dysfunctional affective behaviors will positively affect subsequent student academic performance. They refer to research cited by Bloom that mastery learning produces as a by-product affective consequences that lead to correction of dysfunctional behaviors. Bloom (1981) argues that students who master cognitive objectives will acquire positive attitudes toward learning and toward themselves. On the surface it may appear that direct treatment of such dysfunctional
behaviors as "externality in locus of control," "ineffective study behaviors," "low self image," and the like are, at the least, harmless even if not effective. On the other hand, it should be observed that mastery learning is concerned primarily with instruction—its organization, delivery, and evaluation—and not with dysfunctional affective behaviors. Bloom perceived positive attitudes toward learning as a fortuitous by-product; Roueche and Mink (1976a) claim "that instruction is a necessary but not sufficient condition for the kinds of [mental health] changes" they had expected (p. 231). An inherent conflict lies in the area of allocation of resources and organizational structure: Since community/junior colleges will be involved increasingly with adult basic education at least for the near future, it is important that decision makers have validated models to guide their decisions concerning the expected outcomes of remedial education.

Statement of the Problem

This study examines students with diagnosed writing deficiencies who persist and demonstrate mastery of the subject matter in a mastery learning remedial PSI English course. The study attempts to determine if success in the remedial class adequately prepares the students for a traditional freshman writing course (ENG 110). The study also attempts to determine if success in the mastery learning course affects subsequent college-level work as measured by such criteria as achievement in a non-remedial English class, total credit hours earned (CHE); and overall grade point average (GPA). The study attempts further to determine if students who do not successfully complete the
mastery learning remedial English course succeed in subsequent college level work as measured by achievement in a non-remedial English course (ENG 110), in total credit hours earned (CHE), and in overall grade point average (GPA).

The dependent variables to be examined are:

1. grades in a non-remedial English class, (ENG 110, Freshman Writing);

2. total credit hours earned (CHE) over a two year period;

3. grade point averages (GPA) earned over the two year period of the study.

The independent variables to be examined are:

1. scores achieved on a criterion referenced English Placement Evaluation (EPE);

2. completion or noncompletion of the "Mastery Learning," remedial English course, (the course grade of 4.0 ((Persisters)) or 0.0 ((Nonpersisters)));

3. demographic data which include sex, age at beginning of study, racial/ethnic background, and high school graduated from.

Limitations of the Study

The results of this study were limited by its ex post facto design, population, academic discipline, and non-standardized criterion exam.

1. Kerlinger (1973) discusses three general weaknesses associated with ex post facto research designs: (a) independent variables are not under the control of the researcher; they cannot be manip-
ulated, (b) nor is the scientific effect of randomization possible; (c) consequently, improper interpretation is a risk.

Because numerous interpretations of the research findings can be found which are supported by the data, steps must be taken by the researcher to mitigate the effects of the research design. Noting the potential research dangers is the first step. Forming sound hypotheses to guide the interpretation of the findings is a second step. Observing basic assumptions about intergroup similarities is a third precautionary step.

2. The population for the study consisted of students from only one community/junior college, Kalamazoo Valley Community College—a mid-sized campus serving five school districts in southwestern Michigan—which may not be representative of other populations; e.g., it lacks the social, cultural, racial and ethnic heterogeneity of the large, metropolitan campuses, and the homogeneity of the smaller, rural campuses.

3. The subject discipline area was limited to remedial English, a relatively new subject matter that varies widely in its content and approach. The findings should not be generalized to all forms of remedial English, non-remedial English, other remedial subjects, or other disciplines.

4. The criterion referenced English Placement Exam (EPE) has disadvantages inherent "teacher made" instruments, and special care must accompany their use. This issue is further expanded in the literature review (Chapter II, page 38).
Significance of the Study

The study will provide evaluation information to faculty and administrators at Kalamazoo Valley Community College that will assist them in possible revisions of the mastery learning program or its components. The research will also provide other directors of mastery learning remedial programs with an evaluation model for assessing the effects of remedial programs that attempt to teach basic skills.

The theoretical positions associated with mastery learning will also be under scrutiny in this study. Bloom's concept of mastery learning and Carroll's principles concerning the conditions of learning will be tested. If empirical evidence to support Bloom and Carroll can be discovered, it will provide support to those people and programs at the community college that are concerned with student achievement, remedial instruction, retention, counseling, and program planning for the nontraditional student.

Research Questions

This study was designed to answer the question, do students with diagnosed deficiencies in basic writing skills improve their chances of success in college level English courses and in their overall college experience by enrolling in and persisting in a mastery learning remedial English course? Comparisons will be made between students who enrolled and completed (Persisters) and those who enrolled but did not complete (Nonpersisters). Further comparisons will be made between Persisters in remedial English, students who by virtue of their superior EPE scores were exempted from remedial
English (Exempted Control), and students who were recommended for remedial English but who chose to attempt English without remedial instruction (Non-Exempted Control). Additional comparisons will be made to determine the effect of membership in various nonintellective, demographic groups on persistence, grades in college level English courses, and overall GPA.
CHAPTER II

REVIEW OF SELECTED RELATED LITERATURE

The general concern of this review of the literature was with existing research related to the design, development, delivery, and evaluation of adult remedial education. The focus was narrowed to concentrate on three specific concerns: first, the distinction between comprehensive adult remedial education and discipline centered remedial education especially as they differ in their treatment of so-called "affective behavior characteristics"; second, the research precedents of effects of remedial education in basic writing skills on such outcome measures as gain scores in remedial course work, success in regular college-level writing courses, overall success in college level courses as measured by GPA, and persistence as measured by credit hours earned; finally, the effects of "Mastery Learning" through the application of the Personalized System of Instruction (PSI) as an instructional design model on student achievement, especially in remedial English.

Comprehensive Adult Remedial Education

The connection between comprehensive adult remedial education and subsequent success in college level course work has not been documented. Instead, proponents have advanced models for comprehensive adult
remedial education which include such elements as placement testing, cognitive skills mapping, various administrative support units, and counseling in addition to remedial course work all, presumably, with their feedback loops for validation and evaluation. Despite the passage of eleven years, the conclusions drawn by Roueche in his 1973 study of the merit of remedial programs entitled Catching Up: Remedial Education are still valid. In the study he reached the following three conclusions from his review of related research and literature:

1. There is a pronounced lack of research on the effectiveness of remediation efforts in community colleges in terms of assessing academic performance, persistence, and attitudes of high-risk students.

2. Even with the dearth of research the evidence indicates that remedial courses and programs in two-year colleges . . . have largely been ineffective in remedying student deficiencies.

3. There is an increasing number of critics of the open door college and its implied promise to provide successful learning experiences for all its students (pp. 7-8).

Little more is known of the effectiveness of comprehensive adult remedial education models than was known in the 1970's.

That members of the nontraditional population are handicapped by limited basic academic skills has been adequately documented, but they also typically lack what Bloom (1981) characterizes as "affective" qualities; that is, they lack the will, drive, patience, or perseverance to persist in the process of education. According to Bloom (1976) the "affective characteristics" that students bring to the learning process account for 25 percent of the variability betweenpersisters and nonpersisters. Bloom defines "affect" as "the extent to which the learner will put forth the necessary effort to learn a
specific learning task" (p. 104). An additional 50 percent of the variability is accounted for by "cognitive entry behaviors," that is, the history of the learner as a learner. Three-fourths of the variability between persisters and nonpersisters, therefore, is accounted for by characteristics residing within the learner.

Advocates of comprehensive adult remedial education have emphasized interaction among functions of total programs—counseling, instruction, and administration—and have focused attention on the combination effects rather than on any effects of the components in isolation. Set against this background is Bloom's 1976 research which indicates that it is direct treatment of cognitive entry behaviors that has the greatest impact on the learner's affective behaviors and subsequent academic success (p. 68).

Remedying Dysfunctional Affective Behaviors

Direct Treatment of Affective Behaviors

The emphasis, for example, of Roueche and Snow (1977) is entirely on the comprehensive adult remedial education model, the components of which include (a) course work that is meaningful and relevant to the student audience and carefully ordered by dedicated and sensitive teachers; (b) supportive services which bring together professional and peer counselors with students needing personal and group therapy; and (c) proper organizational support in the form of a department or division of developmental studies responsible for coordinating instruction, recruitment, public relations, staff development, instructional methodology, and evaluation.
Roueche and Snow conceive of the comprehensive adult remedial education program as a total system that treats directly each pathogen revealed by diagnosis of subjects. If a characteristic of high risk students is low self esteem or high externality, then a component to treat those characteristics must be designed and set in place in the comprehensive system. Snow (1977) makes a case for the inclusion of systematic counselling for high risk students. The concept which interests Snow is the adjustment of students' "locus of control," that is, the belief that the individual controls external events as opposed to the belief that external events control the individual: by attacking the belief that external forces control the individual and by replacing it with the belief that the individual is able to exercise control over his own fate, Snow expects students to take responsibility for their own education and to recognize that a payoff awaits them for their diligence and effort ultimately breaking the cycle of "failure identity." Intensive training in communication and problem solving skills is recommended by Snow as prerequisite to the course of study.

As an instructional tool for implementing this model, Roueche and Mink (1976a) designed a program that offered to improve success of nontraditional students by reforming their self-concept. The method involved an attempt at shifting students' perception of who or what controlled their lives. Theoretical support for the instructional student's past, it follows that a structural component for each affective deficiency is needed; however, the amount of baggage produced by such a model is potentially limitless: the deficiencies of
any given student could as easily be rooted in affluence as in poverty, in smothering as in neglect, in parental overexpectation as in indifference; nonetheless, designers of comprehensive programs persist in the view that such components are essential despite absence of support from empirical studies.

Moore (1976) attacks a number of "myths" associated with high risk students and community colleges; among them, germane to this study, are myths about the effects of counseling as prerequisite for learning. His attack is based primarily on acceptance without empirical evidence or on-going study. He further attacks unchallenged acceptance of technologically based instruction and administrative ignorance of causes for students' nonpersistence. The lack of research on issues related to high risk students in community colleges prompted his critical appraisal. "Only when we know can we predict. When we do not know, we must observe, experiment, investigate, and learn" (p. 43).

Change in Affective Behaviors As a By-Product of Instruction

Bloom (1981) cites evidence generated by the International Association for the Evaluation of Education Achievement (IEA) that suggests that "the affective objectives are largely being developed as a by-product of the cognitive objectives. Students who master the cognitive objectives will develop positive interests and attitudes" (p. 44).

Informed designers of instructional programs are alert to the issues surrounding the principle that "success in . . . learning accomplishment is likely to lead to a positive attitude toward that
activity" (Gagne and Briggs, 1974, p. 64). Such instructional designers are careful to construct materials in units small enough and clear enough to assure success. The motivation for design consideration is rooted in principles of learning rather than in counseling.

Research in Remedial English

It is important to recognize that the subdiscipline of remedial English is hampered by the lack of a consensus among practitioners of what the goals of remedial writing should be. The differences among professionals are substantial and have profound effects on content and methodology. If, for example, an instructor is convinced that increased writing maturity as measured by increased T-units in a context is the goal of a remedial writing course, then the instructor will report the results of a methodology on its impact on T-units. Or, if the instructor is concerned with the reduction of the number surface errors, then the instructor will report the effects of a methodology on a pre and post course error count. This lack of agreement on the nature of the dependent variables in research in remedial English is the greatest barrier to meaningful research in the discipline, and one must bear in mind while reading the following section that different researchers use different outcome measures as they describe results of programs. Mina Shaughnessy (1977) asserts that:

Definitions of proficiency in writing vary widely from school to school and from teacher to teacher, with the widest agreement at the lower rungs of the skills ladder, where correctness and basic readability are the concern, and the widest divergencies at the upper rungs where the stylistic preferences of teachers come into play. But even within the province of error, there are disagreements about the importance
of different errors and about the number of errors an educated reader will tolerate without dismissing the writer as incompetent (p. 276).

Or, more succinctly, Shaughnessy defines the criterion variable of remedial basic writing instruction as "... the level a student must reach before a school exempts him from direct instruction in writing" (p. 276).

**Characteristics of Ineffective Remedial English Programs**

Roueche (1968) cited a study of remedial English courses in California by Bossone for the California State Department of Education which found that public junior college remedial English classes were not sufficiently effective. Thirteen factors were listed that contributed to the ineffectiveness of the remedial English courses:

1. Questionable placement procedures;
2. Lack of communication between testing functions, counselling, guidance, and those involved in teaching the remedial English classes;
3. Oversized classes and overworked teachers;
4. Inadequately trained teachers and generally unenthusiastic teachers;
5. Outdated and superficial course outlines;
6. Vague objectives;
7. Lack of agreement about what should be taught in remedial English courses;
8. Lack of suitable instructional materials;
9. Confusion about appropriate methodology;
10. Lack of knowledge about students' reading and writing ability and interests;

11. Lack of knowledge about students' personal problems, limitations, and preferences for methods and materials;

12. Variety of highly subjective grading standards;

13. Insufficient experimentation.

The list of factors cited by the authors would likely produce ineffectual results in any discipline, regular or remedial, with any body of students, traditional or nontraditional. Presumably, an effective program would result if each of the thirteen factors was reversed. Since the issue under consideration by the author was characteristics of ineffective programs, the question of the criteria for judging them ineffective in the first place was never addressed. Unfortunately, the absence of criteria makes the factors moot points: without clearly defined standards of performance of specifically stated behaviors, assessing effectiveness/ineffectiveness is meaningless.

The Factors Reassembled

The criteria for effective/ineffective provide the basis for a model remedial writing program. The criteria determine:

1. What universe of behaviors must be measured to determine both placement and mastery standards; (Factors 1, 2, 6, 7, & 10)

2. What specific writing behaviors must be changed in order for students to meet the expected level of performance; (Factors 5, 6, 7, 8, 11, & 12)

3. What methodology will produce the greatest return for the
resources committed. (Factors 3, 4, 8, 9, & 13)

Shaughnessy and Writing Theory/Pedagogy

Shaughnessy raised four issues in her 1976 address before the Modern Language Association which have influenced the research of scholars concerned with the effects of methodology and content on improved writing competency. These four questions have been recast in essentially the same model as the three point model above—the universe of behaviors to be measured, specific writing behaviors to be changed, and methodology. Shaughnessy asked:

1. What are the stages of growth in writing among adults whose development as writers has been delayed by inferior preparation but who are then exposed to intensive instruction in writing?

2. What subskills of writing, heretofore absorbed by students over time in a variety of situations, can be effectively developed through direct and systematic instruction at the freshman level?

3. What skills have we failed to take note of in our analysis of academic tasks?

4. What goes on and what ought to go on in the composition classroom?

These issues fall squarely within the subdiscipline of remedial writing. Questions one, two, and three, in effect, relate to the universe of behaviors to be measured and have an impact on placement and mastery standards; question three is, in effect, a question of effective methodology and actually begs the question as to whether or not a classroom is the most efficacious environment in which to teach
remedial writing. She offered four "pedagogical perspectives" (1977, p. 276) for teachers of remedial writing to employ and, by extension, researchers to study, as content and methodology are determined:
(1) What is the goal of instruction—awareness, improvement, or mastery? (2) What cognitive strategy works best in teaching a given skill? (3) What environment will likely produce the best results? (4) How do the components meld into a meaningful whole? Absent from Shaughnessy's concerns are issues raised by Roueche, Mink, and Snow about comprehensive remedial programs. One would conclude that in Shaughnessy's view, writing improvement lies in the improvement of writing theory and pedagogy, and her influence has reinforced many researchers in their investigations.

Methodology

Following Shaughnessy's direction, Edmonds (1979) conducted a study of the remedial writing program at Catonsvill (MD) Community College, and concluded that after one semester's work in basic writing students' writing had not improved except in such surface issues as mechanics and grammar. The study was limited to the effects of remedial instruction on undefined writing skills and left the broader issue to be examined by other researchers. Edmonds' recommendations all centered around the improvement of method and the extension of time in the program. Another study conducted by Rank (1979) with 38 underprepared students at Pottersville (CA) Community College concluded that an integrated adult remedial education program; that is, one in which the course work of the various disciplines was integra-
ted, was more effective in retaining students into the following semester than were nonintegrated courses.

**Universe of Behaviors**

An important source of research in remedial writing is the work of Andrea Lunsford (1977, 1978a, 1978b). Her work at The Ohio State University connected low writing skills to low reading rate and low vocabulary development concluding that the remedial English teacher must address reading and vocabulary development and conceptual and inference gathering skills as corollaries to writing methodology. She demonstrated that intensive remedial work in writing produces measurable effects in reading speed, comprehension, inference making, and surface error corrections. Lunsford debunks the sink-or-swim theory: the control group which attempted freshman writing without prior remedial instruction actually lost ground in such subskills as quantity of writing generated, quality of topic sentences formed, and number of surface errors produced.

**Methodology Studies**

Shine (1979) presented a model for an experimental curriculum and methodology based on assumptions and priorities derived from a survey of writing theorists. The model curriculum included (a) cumulative and sequenced assignments; (b) a set of specific goals and objectives, the sum of which identified Shine's definition of basic English skills; and (c) the rationale for revisions based on feedback obtained from a sample population. As with the other researchers cited,
the emphasis of Shine's investigation was on the effects of the
curriculum and methodology on basic writing skills as measured by the
quality of the written product in the post test and compared to the
product written prior to instruction.

Vik (1975) conducted a study of nine successful remedial compo­
sition programs, four in four-year colleges and five in two-year
colleges. In cataloging the elements common to all of the successful
programs, Vik listed the following:

1. all were well planned programs;

2. all operated with trained staff who shared the aims of their
program;

3. all were individualized with flexible time frames allowing
students to enter according to need and exit upon mastery of the
content.

Methodology and content were not necessarily common elements, but
individualization of the subject matter, carefully trained staff, and
counselling were judged the critical independent variables.

The problem common to the studies cited above is the measurement
of gain scores for sets of writing skills defined differently by
different researchers. Each measures effects of writing instruction
on the outcome variables contained in its own study—surface errors,
organization and structure, maturity as gauged by T-unit count, and
the like. Finally, the researchers do not attempt to connect success
in the remedial writing programs with success in subsequent college
level work, and in every instance, disregard affective consequences of
remedial instruction.
Mastery Learning Achieved through Personalized System of Instruction (PSI)

In order to introduce either a PSI or Mastery Learning system into a learning environment, the instructional designer must resolve all of the issues that the previously cited researchers have raised: There must be clearly defined objectives and criteria for measuring their attainment. It is at this point that most remedial programs fall short. Unless a course designer is able to define precisely what outcomes are expected, there is no way of knowing when or if they have been achieved. The discipline has been of little service to its practitioners due, in part, to its inability to express in operational terms the difference between acceptable and unacceptable writing behavior. In deed, the profession has not yet conceded that writing is a learned behavior capable of being learned and therefore taught. One hears otherwise responsible teachers talk of "talent" as the critical independent variable. No methodology can affect innate qualities: learning to acquire blue eyes would be an equivalent skill; yet no responsible professional would advocate teaching that skill. For any methodology to function, two essential preconditions must be in place—a body of organized knowledge and criteria by which performance can be measured. In discussing PSI as a methodology, it is claimed that the preconditions have been met: a body of knowledge has been defined and criteria have been established to measure the performance of individuals who have mastered it.

PSI As an Instructional Methodology

PSI was introduced in 1968 by Fred S. Keller and J. Gilmour
Sherman as a method of instruction for psychology courses. The method quickly caught on, and through the late 1960's and early 1970's was developed to the point where several thousand college courses employed PSI as the primary method of instruction. Since 1974 annual national conferences, a national journal, and newsletters circulated information on PSI to hundreds of instructors teaching in dozens of disciplines. Johnson and Ruskin (1977) cited over 450 references to publications about procedures, applications, and research concerning PSI. As an instructional method, PSI has taken root in disciplines ranging from accounting to zoology. In the "Foreword" to Johnson and Ruskin's Evaluative Review, Kulik (1978) accounts for the attractiveness of PSI to teachers because of its "simple, elegant logic" (p. x). Given the first defining feature, mastery-oriented, he claims that the remaining four features follow logically—individually paced courses, a few lectures for stimulation and motivation, printed study guides for communication of information, and student proctors and individual tutors.

Kulik, Kulik, and Cohen (1979) document the superiority of PSI as an instructional methodology over so-called traditional instruction in a meta-analysis of 75 comparative studies. Results of the study demonstrate that student achievement on final examination comparisons on average is eight percent higher for PSI students than for students enrolled in traditional courses raising the PSI student from the 50th to 70th percentile. In addition, the variability among PSI students is reduced although two variables, time spent in study and rate of course completion, is reported not affected by the PSI methodology.

Johnson and Ruskin (1977) link the features of PSI to the neces-
sary preconditions of learning identified by Carroll (1963) and Bloom (1976). The essential link is the concept of mastery which can occur only if the necessary preconditions for learning exist, i.e., the learner possesses adequate prerequisite knowledge, aptitude, and perseverance. The latter two concepts are functions of time: Carroll (1963) defines aptitude as the amount of time the learner actually devotes to self-conscious learning activity, and perseverance is a measure of the learner's willingness to devote the necessary time. Two additional conditions lie outside the learner and must be supplied by the learning environment—adequate opportunity (time) for learning, and quality of instruction. Defining features and necessary preconditions appear to fuse in PSI methodology to the extent that the self-paced feature is congruous with the need for adequate time to learn. To some degree the lecture feature, which frequently takes the form of various media presentations, enhances the perseverance condition by providing stimulation and incentive. The condition related to quality of instruction links to PSI by its demand for specified, sequenced, and parsimonious learning objectives and precisely corresponding instructional materials. Even though the two streams—PSI behavioral instruction and Mastery Learning—merge in such a way as to appear as a single flow, their sources are different.

PSI As a Methodology for Remedial Instruction

A wealth of publications exists documenting the efficacy of PSI as an effective instructional methodology; but the overwhelming mass deals with applications in upper-level, main stream academic environ-
ments. The 1977 *Evaluative Review* (Johnson and Ruskin) cites only a handful of studies which are remotely related to remedial instruction. Reid, Archer, and Friedman (1977) discuss the use of PSI in the teaching of low reading, middle school students. Fernald and DuNann (1975) describe the effects of PSI upon low and high achieving students and conclude that the data suggest that PSI is of no greater value to low achieving undergraduate psychology students than to their high achieving counterparts. Whitehurst and Madigan (1975) studied slow learners in a PSI course to determine if they learned as much as their faster counterparts. Mills and Frew (1972) described the application of PSI to freshman English courses and concluded that PSI is an efficient, effective, and economical method. Kagel (1975) also described PSI applications to freshman composition courses. The emphasis in these latter two articles was more on displaying the diversity of applications than on the analysis of results.

Two studies—one by Mills and Mehaffy (1977) and the other by Freeman, Boylan, and Evans (1975)—described specific applications in remedial contexts. The latter authors discussed their reasons for choosing PSI for their remedial programs in basic skills as well as introductory courses in economics, biology, speech, and psychology at Bowling Green State University (BGSU). Their populations were defined as 98 percent ethnic minorities and 82 percent freshmen whose composite ACT scores were 11.1. BGSU freshmen ACT scores exclusive of the educationally disadvantaged students were 21.3; the national composite score was 22.3. The authors claimed an increase in retention from a previous 65 to 70 percent level to "better than 85 percent" after the
installation of PSI. The former authors described their use of PSI in a remedial English course listing advantages over the previous method. Although both sets of authors acknowledged the necessity for follow-up studies, neither has published such studies to date.

**PSI As the Organizing Principle for ENG 098 at KVCC**

The administration at Kalamazoo Valley Community College began to support the development of alternative instructional modes for non-traditional students in basic skills as early as 1971, two years after the college opened its doors. Gradually, components were added to the remedial English course that cumulatively produced a relatively pure form of the "Mastery Learning" model. The components included:

1. a criterion referenced pretest to measure the extent of preparedness of entering students against the exiting criteria for the program;

2. a consensus of English instructors which prescribed the expected entry level writing behaviors for freshman composition and the consequent exit level writing behaviors for remedial English;

3. instructional materials designed after the so-called Keller Plan of personalized system of instruction (PSI) which include:
   - sequenced modules of instruction each with a series of behavioral objectives superimposed over the the Bloom (1969) *Taxonomy of Educational Objectives—Cognitive Domain*—at the definition, recognition, and application levels; 
   - a set of self-contained materials and learning activities; 
   - two self-evaluation components; 
   - multiple forms of penalty-free mastery tests with one-on-one tutorial interven-
tion between attempts to verify mastery of the objectives; (e) a comprehensive mastery post test;

4. a liberal "incomplete" policy which allows students to extend their study up to two years;

5. a self-pacing procedure which allows students to complete as rapidly or as slowly as they choose;

6. an open laboratory staffed 56 hours per week including weekends and with a telephone hot line service available during business hours.

Since 1975 this structure has been in place, and increasing numbers of students have chosen to enroll in the program. Approximately 53 percent of those who enrolled each semester persisted and eventually completed the course while 47 percent did not persist. This division between persisters and nonpersisters offered an opportunity to investigate the subsequent progress of these two discrete groups of students who diverged at an early stage of their college careers in at least one critical area of basic skill development; and one factor in the discreteness is the Mastery Learning experience.

The Dependent Variables: Research Precedents

Virtually all of the studies published which assess the effectiveness of developmental programs look to such outcome measures as retention and grade point averages (GPA). These measures are identified with a variety of synonyms—persistence, credit hours earned, success, completion or completion rate, graduation. Those that use other outcome measures frequently identify such terms as gain scores.
(usually associated with pre and post course criterion-referenced test scores) and subsequent grade (usually associated with course grade in college-level courses following a remedial experience). Rosomer (1978) in his study of 57 remedial programs funded by the legislature of the State of Ohio reported that only two program directors used retention as the only measure of program success; one used GPA only; three used both retention and GPA; and sixteen used various gain scores. Rosomer cited the program goals of one community college as instituting its developmental program "to lower attrition and to raise GPA."

In his contrast of the failure of developmental studies in general with the success of Mastery Learning programs in Chicago community colleges, Chausow (1979) observed that remedial programs had not produced the desired results—student and institutional retention remained low, and student achievement in remedial courses did not result in improved performance in regular courses. On the other hand, in remedial programs using the mastery approach, student achievement and retention were not only superior to those attained in nonmastery programs but were also higher than achievement and retention of students in regular programs and courses taught in nonmastery fashion.

Cicco and Associates (1979) undertook an evaluation of the Westmoreland County Community College developmental program in which the evaluators were concerned with assessing the effects of the program on its clients' records of "persistence and academic performance," the college's financial situation, and the community's labor market. The issue of the costs of the remedial program was introduced
in this study as well as where the successful graduates located employment after graduation.

Davis (1975) conducted the most wide-ranging of all studies of remedial programs for the Office of Education (DHEW). His research obtained data from 190 projects involving more than 50,000 students. The students were recipients of benefits under the Higher Education Amendment of 1968 and were defined as, "disadvantaged" under federal guidelines. Three years of remedial activity were analyzed to determine effects of students' academic progress, satisfaction, and perceptions. The major finding was that availability of remedial education failed to improve students' performance. Contributing variables such as race, economic level, and physical handicaps were also investigated. Performance and attitude were the two outcome measures employed by Davis.

The most assiduous scholar to concern himself with the assessment of the merit of remedial programs is John Roueche. In his 1973 study entitled Catching Up: Remedial Education he outlined the purposes of the study as follows: "to assess the effects of selected innovative remedial education programs on students' academic performance and persistence in college" (p.9). Roueche identified two criteria for program, credit hours earned (retention) and GPA (the mean of the grades earned). He listed three other evaluation goals including students' attitudes toward the programs judged innovative; the identification and description of program characteristics related to the success or failure of the programs in terms of student attitude, persistence, and academic performance; and finally the investigation
of relationships among such variables as persistence, academic achievement and attitudes of students of major race-ethnic groups.

The Criterion-Referenced Pretest

The use of the criterion-referenced pretest is supported by Popham and Husek (1969) who distinguish between norm-referenced and criterion-referenced tests partly in terms of their intended uses: a norm-referenced test is employed in situations where selectivity is required as, for example, when a limited number of openings is available and choices must be made to identify candidates with the best potential relative to others. Criterion-referenced tests, on the other hand, measure an individual's performance against a standard of competence regardless of the performance of others. Since the stated prerequisite competence for the freshman writing course at KVCC was the production of an error-free, one paragraph summary of a five paragraph essay, the purpose of the EPE was to distinguish consistently those who met the criterion from those who did not; therefore, the EPE required students to write a one-paragraph summary which was judged against a criteria list of 83 items with each item weighted on a scale from one to five (trivial error to gross, meaning-affecting error. The score and consequent placement recommendation were the result of the total error points accumulated in the summary. Consistency was assured by periodic regrading by various judges and calculating the Kendall coefficient of concordance described in Siegel (1956). In addition, periodic interjudge reliability checks were made by calculating Pearson product moment correlation coefficients between pairs of test graders.
pairs of test graders.

Popham and Husek (1969) point out a feature of an ideal criterion-referenced test which the EPE lacks; i.e., equivalent scores on the EPE do not necessarily represent the same configuration of errors. For example, the mean score of 27 could be the result of nine different punctuation errors, or five different sentence structure errors, or any combination of spelling, sense, usage, or form errors. The authors observe that there seems to be no way around the problem except "in relatively restricted and formal areas such as mathematics" (p. 9).

The Research Design

The theoretical support for the choice of the *ex post facto* research design comes from Kerlinger's (1973) discussion of "Types of Research" in which it is observed that causal explanations of the various independent variables on dependent variables is not possible. The impossibility of randomization and of manipulation of the independent variables to observe effects of the dependent makes *ex post facto* designs suspect. The researcher conscious of the limitations of such a design seeks alternative explanations, in effect attempting to exhaust the possible explanations for observed relationships between independent and dependent variables. The researcher employing this design is limited to inferences about relationships. "Controlled inquiry" (p. 392) is the operative term, and such inquiry is productive provided it is guided by hypotheses and that alternative negative hypotheses are pursued. This requirement
makes all conclusions tentative and contingent upon the exhaustiveness of the explanations of alternatives.

Placement Testing in Remedial Education

Identifying specific candidates for remedial education programs is potentially expensive both in time and money for both students and institutions. The global category of high-risk students is fairly well defined. Astin (1975) has produced regression formulas which account for virtually all of the variability between persisters and nonpersisters. From the broadest perspective, Astin identified the most salient characteristics that college freshmen possess that relate to persistence in college. High school grades are by far the best predictors of persistence. Astin determined that 87 percent of A or A+ students persisted as college freshmen; C students persisted at only 44 percent. Students with high school grades between C and A+ were distributed proportionately along the scale. Other measures such as rank in high school graduating class, college admissions tests, academic rating of high school, race, religion, family income, and even whether or not one frequently smoked cigarettes or earned a varsity letter contributed to the regression formula. Astin (1975) laid the groundwork for more precise placement testing in specific institutions to identify individual students' remedial needs. At an institution, admissions counsellors have a ready index in high school grades. Furthermore, the potency of other indicators endemic to an institution can be tested over time provided appropriate data are gathered and adequately analyzed.
CHAPTER III

DESIGN AND METHODOLOGY

Nature of the Study

This was an ex post facto study that examined academic efforts of a population of 780 students divided into four subgroups. Subjects' academic records were compared after two years from their initial enrollment to determine the extent of difference that may be observed between persisters in the PSI remedial English course and their nonpersisting classmates. The subjects had been originally identified according to degrees of preparedness as measured by the English Placement Exam (EPE), a criterion-referenced instrument used at KVCC for assessing the level of students' entry-level writing skills and for recommending enrollment in either a remedial or college-level English course.

Population and Selection

Group I—Exempted Control (N=84)

Since the EPE reveals degrees of underpreparedness, it was assumed that the students whose scores ranged between 0 (no errors in a one-paragraph summary) and 16 (three to five errors) formed a group that was adequately prepared to enter freshman writing (ENG 110).
This group served as a norm group. Its members demonstrated mastery of the terminal objectives of the remedial English course, ENG 098; that is, they were able to compose a one-paragraph summary of a five-paragraph essay and to do so with a minimum of spelling, grammatical, punctuation, and content errors. It was further assumed that students with this level of skills possessed the necessary prerequisite skills to succeed in freshman writing provided they applied themselves and the quality of instruction was satisfactory.

The subjects that were selected to represent this group and Group IV were located in the EPE files from alphabetical listings using the letters "A", "C", "E", and "K" randomly drawn from the alphabet. The risk of some ethnic bias was weighed against the difficulty of acquiring a true random sample from the EPE files. These subjects shared the following qualities:

1. Their EPE scores fell between 0 and 16.
2. They enrolled in ENG 110 in the fall terms of 1979, 1980, or 1981.
3. They enrolled in no other remedial English course at KVCC.
4. They enrolled for at least 12 credit hours in the fall semester of their respective year.

Group II—(Persisters) (N=350)

Group characteristics. This group consisted of subjects who elected to enroll in ENG 098 either as a result of recommendations generated by their EPE scores or by virtue of some personal felt need despite satisfactory EPE scores. This group persisted in the course
to earn a grade of 4.0. They enrolled during the fall semesters of 1979, 1980, 1981 and completed the course by May 1983. Their EPE scores ranged between 15 and 84.

Persistence defined. To persist, these subjects completed the equivalent of twenty units of sequenced instruction that began with the production of two-word sentences and ended with the composition of a one-paragraph summary of a five-paragraph essay. The instructional mode was characterized by the following features: self-paced, open laboratory, tutorial course of study developed on the Keller-system of PSI. Students prepared themselves to attempt mastery of each unit by interacting with (a) a set of specific unit objectives; (b) corresponding text materials which provided definitions, examples, and application models; and (c) sample test items. Mastery of the individual unit objectives was demonstrated by a score of 90 percent or better. Failure to demonstrate mastery on the first attempt resulted in no grade penalty but caused the individual tutorial process to commence which assisted the student to prepare to demonstrate mastery on a second attempt. A third mastery test was available for students who needed further assistance from the program's professional instructor. Persisters were able to accelerate their progress by a series of plateau tests which combined several related units; at the other end, troublesome units could be subdivided into single objectives and mastered in smaller segments. Of the 350 persisters, only 20 exercised the options of plateau tests or sub-unit tests.

At the end of ENG 098, persisters were required to pass a post
test consisting of a one-paragraph summary of a longer essay with a score between 0 and 16, i.e., the range of the pretest exemption.

**Group III—(Nonpersisters) (N=312)**

**Group characteristics.** This group was formed on the basis of failure to persist in ENG 098. Like Group I these subjects were recommended to enroll in ENG 098 by virtue of their EPE scores. Unlike their persisting classmates, they failed to complete the course within a two year limit and were awarded a course grade of 0.0.

Of the 312 nonpersisters in the study, 188 or 60 percent of the group enrolled completed zero units of instruction; 66 of that number were "no shows," that is, their names appeared on grade lists but they had made no contact with the laboratory; 122 reported for orientation but did not return for Unit One.

Of the remaining 124, completion rates were as follows:

<table>
<thead>
<tr>
<th>Units</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eleven to twenty units</td>
<td>0</td>
</tr>
<tr>
<td>Ten units</td>
<td>1</td>
</tr>
<tr>
<td>Nine units</td>
<td>1</td>
</tr>
<tr>
<td>Eight units</td>
<td>9</td>
</tr>
<tr>
<td>Six units</td>
<td>4</td>
</tr>
<tr>
<td>Five units</td>
<td>7</td>
</tr>
<tr>
<td>Four units</td>
<td>20</td>
</tr>
<tr>
<td>Three units</td>
<td>38</td>
</tr>
<tr>
<td>Two units</td>
<td>30</td>
</tr>
<tr>
<td>One unit</td>
<td>14</td>
</tr>
</tbody>
</table>

124
Group IV—Non-Exempted Control (N=34)

The subjects within Group IV were students whose EPE scores indicated that remedial English was necessary, that is, higher than 16 but who opted not to follow the recommendation to enroll in ENG 098 and instead enrolled in ENG 110 without prior remedial instruction. The subjects selected to represent this group, like Group I, were drawn from the EPE files using the same randomly chosen alphabetical listings. These subjects shared the following qualities:

1. Their EPE scores fell between 17 and 84.
2. They opted not to enroll in ENG 098 in the fall terms of 1979, 1980, and 1981 but instead enrolled in ENG 110.
3. They had not enrolled in any remedial English course at KVCC.
4. They had enrolled for at least 12 credit hours in the fall of their respective year.

Hypotheses

The hypotheses tested in this study attempted to describe the differences between Persisters in the remedial course and Nonpersisters and to compare their subsequent academic achievement with subjects who were judged adequately prepared. There is a basic underlying assumption that all four groups are similarly composed; that is to say, such nonintellective characteristics as sex, ethnicity, age, and high school from which graduated are normally distributed among all groups.

The first hypothesis tested the proposition thatPersisters (Group II) were adequately prepared for freshman writing and success in
subsequent college level course work by comparing the performances of the Persisters (Group II) and Nonpersisters (Group III) in three areas—Grade in ENG 110, Credit Hours Earned (CHE), and in Grade Point Average (GPA).

**Hypothesis I**

I. Significant differences will occur between Persisters (Group II) and Nonpersisters (Group III) in each of the three outcome measures—Grades in ENG 110, Credit Hours Earned (CHE), and Grade Point Average (GPA)—regardless of the extent of diagnosed difficulties in basic writing skills as measured by scores on the EPE.

**Hypothesis II**

The second hypothesis tested the proposition that Persisters will perform on a par with peers (Group I) whose initial writing skills were assessed as superior or adequate by the EPE; that is, their scores fell between 0 and 16 and they were recommended to enroll in ENG 110 without remedial intervention. The more alike their achievement in the dependent variables, the stronger the inference that may be drawn concerning the efficacy of the PSI treatment.

II. No statistically significant difference will occur between Persisters (Group II) and subjects who were exempt from ENG 098 (Group I) in the following dependent variables: Grades in ENG 110, Credit Hours Earned, and GPA.

**Statistical Method**

The principal statistical tools in this study were multiple...
regression analysis and two-way analysis of variance. The former method allows an investigator to study the effects of any number of independent variables on a dependent variable to determine both the cumulative effects of all the independent variables on the dependent variable and the extent of relative contribution each independent variable makes on the dependent variable. Kerlinger (1973) describes the method "to be especially elegant" in that one of its products is the "multiple regression coefficient, . . . one of the links that bind together the various aspects of multiple regression and analysis of variance" (p. 616). The multiple regression coefficient is the "highest possible correlation between a composite of independent variables and the dependent variable. This method is an especially useful explanatory tool in ex post facto research since it allows the investigator to study the combined influence of any number of variables regardless of their level of measurement. For example, in this study the independent variables of sex, high school (from which subjects graduated), age, and EPE scores can all be fitted into a formula that analyzes their effect on the dependent variable GPA. The prediction capability of the method is as important as the explanatory power. The multiple regression analysis method generates values that allow the investigator to predict an outcome score from a given observed score using the following formula:

\[ Y' = a + b_1x_1' + \ldots + b_kx_k + e \]

where \( a \) = intercept constant

\( b \) = regression coefficient for each independent variable;

\( Y' \) = predicted scores of the dependent variable;
\[ x = \text{observed scores of the independent variables}; \]
\[ k = \text{the number of independent variables}; \text{ and} \]
\[ e = \text{error (i.e., the unaccounted for variance from all sources)} \]

The latter method, two-way ANOVA, complements the former in that the tables generated by the procedure display relationships between variables which allow for convenient comparisons as well as documentation of significant differences between independent variables.

The Independent Variables

Two classes of independent variables were considered in this study, intellective and nonintellective.

Nonintellective Variables

The principal independent variable in this study is persistence or nonpersistence in the remedial writing program, ENG 098, offered through the Writing Lab at KVCC. Persistence is defined as the mastery of twenty units of instruction (or their equivalence) and the passing of the criterion referenced post test with a score between zero and sixteen. Any behavior less than completion is defined as nonpersistence. Other nonintellective independent variables include the subjects' ages, sex, their racial/ethnic backgrounds, their high schools and years of graduation. This study includes a test to demonstrate that the independent variables are distributed normally between the persisters and nonpersisters. In effect, the characteristics that account for the difference between the two groups will appear in the regression formula as "e" (error) and serve as the
starting point for subsequent studies.

**Intellective Variables**

The central intellective variable in this study was the level of writing skills as measured by the EPE, a criterion referenced placement test designed to weight the numbers and qualities of errors occurring in a one-paragraph summary of a five-paragraph essay.

**The Dependent Variables**

The major dependent variables in this study were the typical measures of academic achievement—GPA, grades earned in ENG 110, and the number of credit hours earned. One part of the study required that the independent variable Grade in ENG 098 serve as a dependent variable; in another part, the same grade served as an independent variable operating on Grade in Freshman Writing and GPA. Finally, the dependent variable Grade in Freshman Writing served as an independent variable in an analysis of credit hours earned by persisters, nonpersisters, and the two control groups.

**Data Gathering**

Data on all subjects in the study were gathered from several sources of student records stored in the Kalamazoo Valley Community College computer files: The Admissions and Records Offices supplied age, racial/ethnic data, high school and year of graduation; Student Transcript Files provided specific course grades, GPA, credit hours earned, and years and semesters of enrollment for each student. Data
concerning the number of units completed, EPE and post test scores of Persisters and Nonpersisters were drawn from course enrollment cards filled out by the students at the time of orientation and preserved in the English Lab records. "No shows" were identified from grade sheets supplied by the Records Office for all sections of ENG 098 in the fall semesters of 1979, 1980, and 1981.

Data Analysis

The data set was analyzed using statistical procedures contained in the DEC-10 system at Western Michigan University's Computer Center. The regression analysis program used was located in the Statistical Programs for Social Sciences (SPSS), and summary analysis was managed on WMU's Stat Pack.
CHAPTER IV

RESULTS

This study dealt with two hypotheses that measured the effects of persistence by students in a remedial English course (ENG 098), nonpersistence by students, and nonexposure to the course by students on the following three criterion variables: 1. Grade achieved in a college-level freshman English course, Freshman Writing (ENG 110); 2. total credit hours earned during period of study (CHE); and 3. overall grade point average earned during period of study (GPA). The population consisted of four groups of students categorized by the nature of their exposure to a remedial English program: Group I, Exempted Out Control (n=84); Group II, Persisters (n=350); Group III, Nonpersisters (n=312); and Group IV Non-Exempt Control Group (n=34). Hypothesis I tested to determine if any relationship existed between the three criterion variables (Grade in ENG 110, CHE and GPA) and two independent variables, English Placement Exam (EPE) scores and exposure to remedial writing instruction. Since exposure to remedial English was one of the independent variables, only subjects in Groups II and III were compared, and only those subjects in those two groups who had subsequently enrolled in ENG 110.

Hypothesis I

Significant differences will occur betweenPersisters and Nonpersisters in grades in ENG 110, total credit hours earned (CHE), and

50
overall grade point average (GPA) regardless of the extent of diagnosed difficulties in basic writing skills as measured by scores on the English Placement Exam.

Table 1 displays the mean English 110 grades and standard deviations for both subgroups. The Persisters (n=274) earned an average ENG 110 grade of 2.845 on a four point scale compared to a grade average of 1.489 for the Nonpersisters (n=95). The standard deviations for all EPE categories indicate a wider range of scores among the Nonpersisters than among the Persisters.

Table 1

Mean and Standard Deviation of Grades in ENG 110 for Persisters and Nonpersisters in ENG 098 and Level of Initial Writing Skills as Measured by EPE Raw Scores and Categories.

<table>
<thead>
<tr>
<th>EPE Categories</th>
<th>A/B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score ranges</td>
<td>0to16</td>
<td>17to27</td>
<td>28to38</td>
<td>39to49</td>
<td>50to85</td>
<td>Score</td>
<td>Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n (5)</td>
<td>(94)</td>
<td>(100)</td>
<td>(46)</td>
<td>(25)</td>
<td>(4)</td>
<td>(274)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persist mean</td>
<td>2.90</td>
<td>2.86</td>
<td>2.93</td>
<td>2.88</td>
<td>2.44</td>
<td>2.88</td>
<td>2.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s.d.</td>
<td>0.73</td>
<td>0.69</td>
<td>0.67</td>
<td>0.79</td>
<td>0.75</td>
<td>0.80</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n (2)</td>
<td>(29)</td>
<td>(29)</td>
<td>(12)</td>
<td>(8)</td>
<td>(15)</td>
<td>(95)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonpersist mean</td>
<td>2.25</td>
<td>1.76</td>
<td>1.45</td>
<td>1.00</td>
<td>1.50</td>
<td>1.33</td>
<td>1.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s.d.</td>
<td>1.06</td>
<td>1.42</td>
<td>1.43</td>
<td>1.31</td>
<td>1.10</td>
<td>1.44</td>
<td>1.08</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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# Table 2

Average English 110 Grade for Persisting and Nonpersisting Subjects by EPE Raw Score and Categories (A, B, C . . . H)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Persisters (n=274—78% of subgroup)</th>
<th>Nonpersisters (n=95—30% of subgroup)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Number of subjects appears in parentheses)</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>(100)</td>
<td>(15)</td>
</tr>
<tr>
<td>3.5</td>
<td>(5)</td>
<td>(29)</td>
</tr>
<tr>
<td>3.0</td>
<td>(46)</td>
<td>(29)</td>
</tr>
<tr>
<td>2.5</td>
<td>(94)</td>
<td>(25)</td>
</tr>
<tr>
<td>2.0</td>
<td>(2)</td>
<td>(12)</td>
</tr>
<tr>
<td>1.5</td>
<td>(1)</td>
<td>(8)</td>
</tr>
<tr>
<td>1.0</td>
<td>(29)</td>
<td>(15)</td>
</tr>
<tr>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EPE Scores 0 . . . 8 . . . 16 . . . 27 . . . 38 . . . 50 . . . 85

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No Scores Total Scores
Persisters differ significantly from Nonpersisters on the criterion variable ENG 110, and the difference is not attributable to differences in initial level of writing skills (EPE scores). Further, the evidence indicates that completion of ENG 098 adequately prepared students for ENG 110.

Two statistical procedures were used to test the relationship between the two groups, a two factor analysis of variance and a multiple regression analysis. The two factor was selected to examine the possibility of an interaction effect between the extent of initial writing ability (EPE Score) and persistence or nonpersistence of the students.

The multiple regression procedure was selected to determine the extent of correlation that occurred between the two independent variables and each of the three criterion variables and to develop a prediction formula based on the relative contributions that each independent variable made toward the three criterion variables.

Table 3 contains the analysis of the variance between Persisters and Nonpersisters to determine if the mean grades in ENG 110 within the levels of initial writing skills differed significantly and whether or not differences can be attributed to interaction between EPE level and persistence or nonpersistence. An F value for the "Interaction Effects" must exceed 1.22 and produce a significance level of less than .346 to be significant. The grade achieved in ENG 110 was found to be significantly different between Persisters and Nonpersisters at the .05 level.
Table 3

Two factor ANOVA between EPE and ENG 098 on Grade in Freshman Writing (ENG 110).

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Squares</th>
<th>Significance F of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>142.03</td>
<td>11</td>
<td>12.91</td>
<td>.0000*</td>
</tr>
<tr>
<td>ENG 098</td>
<td>41.88</td>
<td>1</td>
<td>41.88</td>
<td>41.19 .0000*</td>
</tr>
<tr>
<td>EPE</td>
<td>5.73</td>
<td>5</td>
<td>1.15</td>
<td>1.13 .3459</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPE by ENG 098</td>
<td>6.22</td>
<td>5</td>
<td>1.24</td>
<td>1.22 .2973</td>
</tr>
<tr>
<td>Within</td>
<td>362.97</td>
<td>357</td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>505.00</td>
<td>386</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05 level

The results of the multiple linear regression analysis can be found in Table 4. The table displays not only both the correlations between the individual independent variables, ENG 098 and EPE, and the dependent variable, Grade in ENG 110; and the combined effects of both independent variables on the dependent variable.

Table 4

Regression Analysis Summary Table for ENG 098 and EPE on Grade in Freshman Writing (ENG 110).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simple Corr</th>
<th>Multiple Corr</th>
<th>$R^2$</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 098</td>
<td>0.504</td>
<td>0.509</td>
<td>0.259</td>
<td></td>
</tr>
<tr>
<td>EPE</td>
<td>-0.077</td>
<td></td>
<td></td>
<td>0.006</td>
</tr>
</tbody>
</table>
Table 5

Total Credit Hours Earned for Subjects Who Persisted in ENG 098 and Those Who Did Not Persist with Initial Writing Skills as Measured by EPE Raw Scores and by Categories.

<table>
<thead>
<tr>
<th>EPE Scores</th>
<th>0</th>
<th>8</th>
<th>16</th>
<th>27</th>
<th>38</th>
<th>50</th>
<th>85</th>
<th>No Scores</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categories</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

(Number of subjects appears in parentheses)
The combined correlation coefficient produced an $R^2 = .509$ which accounts for 26 percent of the variability between the two groups. Separately, ENG 098 accounts for over 25 percent while EPE accounts for a negligible .006.

**Total Credit Hours Earned (CHE) As Criterion Variable**

Table 6

Mean and Standard Deviation of Total Credit Hours Earned for Persisters and Nonpersisters with Level of Initial Writing Skills as Measured by EPE Raw Scores and by Categories.

<table>
<thead>
<tr>
<th>EPE Categories</th>
<th>A/B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score ranges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>8</td>
<td>117</td>
<td>116</td>
<td>65</td>
<td>36</td>
<td>8</td>
<td>350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persist mean CHE</td>
<td>37.8</td>
<td>43.3</td>
<td>45.5</td>
<td>39.6</td>
<td>40.1</td>
<td>28.1</td>
<td>42.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s.d.</td>
<td>22.3</td>
<td>20.3</td>
<td>21.0</td>
<td>17.8</td>
<td>19.6</td>
<td>31.2</td>
<td>20.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>61</td>
<td>85</td>
<td>66</td>
<td>42</td>
<td>53</td>
<td>312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonper mean CHE</td>
<td>32.2</td>
<td>17.5</td>
<td>14.3</td>
<td>9.5</td>
<td>11.5</td>
<td>13.2</td>
<td>13.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s.d.</td>
<td>38.7</td>
<td>21.2</td>
<td>18.1</td>
<td>11.5</td>
<td>17.6</td>
<td>19.0</td>
<td>17.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 displays the extent of significant differences between the two subgroups. Persisters earned substantially more credit hours than Nonpersisters over a two year period. The slope of the lines in Table 5 indicates a slight tendency toward interaction effect; that is, the Nonpersisters with EPE scores indicating greater deficiencies earned substantially fewer credit hours than their cohorts with better (but not adequate) scores.
Table 7

Two-way ANOVA between EPE and ENG 098 on Total Credit Hours Earned

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Squares</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>144,929.83</td>
<td>11</td>
<td>13,975.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 098</td>
<td>30,150.46</td>
<td>1</td>
<td>30,150.46</td>
<td>71.04</td>
<td>.0000*</td>
</tr>
<tr>
<td>EPE</td>
<td>5,433.29</td>
<td>5</td>
<td>1,086.66</td>
<td>2.56</td>
<td>.0263*</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 098 by EPE</td>
<td>3,867.31</td>
<td>5</td>
<td>773.46</td>
<td>1.82</td>
<td>.1063</td>
</tr>
<tr>
<td>Within</td>
<td>275,854.22</td>
<td>650</td>
<td>424.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>420,784.05</td>
<td>661</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05 level

Table 7 indicates, however, that a hypothesis concerning interaction effect would be rejected at a p<.05 level although a clear tendency toward interaction appears in Table 5, and Table 7 displays a probability of 0.1063 that interaction effect occurs. A somewhat higher correlation exists between CHE and EPE scores (r=-0.270) than between EPE and Grade in ENG 110 (r=-0.077) lending credence to the argument that effects of persistence in ENG 098 are more strongly observed in Freshman Writing than in CHE. Although Persisters remain in college longer regardless of initial writing skills level, Nonpersisters trail off in CHE relative to declining initial writing skills.
levels to a small extent. Whereas the multiple correlation for EPE and ENG 098 accounts for 26 percent of the variability between the two subgroups on the criterion variable ENG 110, 32.8 percent of the variability is accounted for by the two independent variables on the criterion variable CHE. The additional contribution of the EPE score to the multiple correlation is a negligible 0.003 to the ENG 098 score alone.

Table 8
Regression Analysis Summary Table for ENG 098 and EPE on Credit Hours Earned.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simple Corr</th>
<th>Multiple Corr</th>
<th>( R^2 )</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 098</td>
<td>0.573</td>
<td>0.328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPE</td>
<td>-0.121</td>
<td>0.575</td>
<td>0.331</td>
<td>0.003</td>
</tr>
</tbody>
</table>

By applying the formula the Persister with an EPE score of 22, for example, would be predicted to earn 44 credit hours over a two year period. \( Y = 17.58 + ((7.18 \times 4.0)) + ((-0.109 \times 22)) \). The Nonpersister with the same EPE score would be predicted to earn 15.2 CHE. \( Y = 17.58 + 0 + ((-0.109 \times 22)) \).
Table 9

Grade Point Average after Two Years of Subjects Who Persisted in ENG 098 and Subjects Who Did Not Persist with Initial Writing Skills as Measured by EPE Raw Scores and by Categories.

(Number of subjects appears in parentheses)

<table>
<thead>
<tr>
<th>Grade Point Average</th>
<th>Persisters (n=350)</th>
<th>Nonpersisters (n=312)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(117) (116)</td>
<td>(85) (66)</td>
</tr>
<tr>
<td></td>
<td>(65) (36)</td>
<td>(42) (53)</td>
</tr>
<tr>
<td></td>
<td>(8) (5)</td>
<td>(8) (61)</td>
</tr>
</tbody>
</table>

EPE Scores

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
<td>16</td>
<td>27</td>
<td>38</td>
<td>50</td>
<td>85</td>
</tr>
</tbody>
</table>
Table 9 was generated from Table 10. Both Persisters (n=350) and Nonpersisters (n=312) were included in Table 9. The configuration for the criterion variable GPA is consistent with the criterion variables ENG 110 and CHE; that is, thePersisters appear as a virtual horizontal line across all levels of initial writing levels indicating that the criterion variables are unaffected by the Persisters' EPE scores. On the other hand, the Nonpersisters gradually trail off as initial writing levels decrease.

The difference between the two subgroups is documented statistically by the significance of F (p=0.0000) displayed in Table 4.3B. As with the criterion variable CHE, the issue of absence of interaction effect is not clearly resolved by the significance level (p=0.2735) indicating that Nonpersisters with lower entry level writing skills can be expected to earn lower GPA's over the two year period.

Table 10 indicates that a substantial correlation exists between Grade in ENG 098 and GPA (r=0.648) and that 42 percent of the variability between the two subgroups is accounted for by ENG 098 alone; by combining EPE with ENG 098, a negligible 0.006 increase occurs.
Table 10
Two-way ANOVA between EPE and ENG 098 on Overall Grade Point Average (GPA).

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Squares</th>
<th>F of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>550.75</td>
<td>11</td>
<td>50.07</td>
<td></td>
</tr>
<tr>
<td>ENG 098</td>
<td>150.73</td>
<td>1</td>
<td>150.73</td>
<td>234.56</td>
</tr>
<tr>
<td>EPE</td>
<td>16.64</td>
<td>5</td>
<td>3.33</td>
<td>5.18</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPE by ENG 098</td>
<td>4.09</td>
<td>5</td>
<td>0.82</td>
<td>1.27</td>
</tr>
<tr>
<td>Within</td>
<td>417.68</td>
<td>650</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>968.42</td>
<td>661</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05 level.

Table 11
Regression Analysis Summary Table for ENG 098 and EPE on Overall Grade Point Average.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simple Corr</th>
<th>Multiple Corr</th>
<th>R²</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 098</td>
<td>0.743</td>
<td></td>
<td>0.553</td>
<td></td>
</tr>
<tr>
<td>EPE</td>
<td>-0.221</td>
<td>0.753</td>
<td>0.566</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Hypothesis II

No statistically significant differences will occur between Persisters (Group II) and subjects not exposed to remedial English.
either by virtue of superior EPE scores (Group I) or by personal choice despite unsatisfactory EPE scores (Group IV) in the following dependent variables: Grades in ENG 110, CHE, and GPA.

Hypothesis II was concerned with establishing the essential similarity between the Persisters and the two remaining subgroups which were formed as a result of their nonexposure to ENG 098. Subjects of Group I (n=84) were recommended to enroll directly in ENG 110 by virtue of their superior EPE scores (0 to 16); subjects of Group IV (n=34) were recommended to enroll in ENG 098 but opted to enroll in ENG 110 despite inadequate EPE scores (17 to 34).

Table 12 presents a summary of the results of two factor analysis of variance on each of three criterion variables by 1) completion of or nonexposure to ENG 098 and 2) by EPE level, high or low. The results support the hypothesis that no statistically significant differences existed among the groups. That is to say, Persisters performed on a par with students who enrolled directly in freshman writing by virtue of their assessed superior writing skills.
Table 12

Means, Standard Deviations, and Probability of Significance for Persisters—High and Low Initial Writing Skills—and Group I—High Initial Writing Skills—and Group IV—Low Initial Writing Skills

<table>
<thead>
<tr>
<th>EPE Range</th>
<th>GROUP II</th>
<th>GROUP I</th>
<th>GROUP IV</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Lo</td>
</tr>
<tr>
<td>ENG 110</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>269</td>
<td>84</td>
<td>34</td>
</tr>
<tr>
<td>mean</td>
<td>2.90</td>
<td>2.85</td>
<td>3.29</td>
<td>2.71</td>
</tr>
<tr>
<td>s.d.</td>
<td>.96</td>
<td>.85</td>
<td>.74</td>
<td>1.22</td>
</tr>
<tr>
<td>CHE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>8</td>
<td>342</td>
<td>84</td>
<td>34</td>
</tr>
<tr>
<td>mean</td>
<td>35.75</td>
<td>42.71</td>
<td>45.74</td>
<td>35.03</td>
</tr>
<tr>
<td>s.d.</td>
<td>17.63</td>
<td>22.77</td>
<td>22.86</td>
<td>24.17</td>
</tr>
<tr>
<td>GPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>8</td>
<td>342</td>
<td>84</td>
<td>34</td>
</tr>
<tr>
<td>mean</td>
<td>2.76</td>
<td>2.80</td>
<td>3.07</td>
<td>2.45</td>
</tr>
<tr>
<td>s.d.</td>
<td>.73</td>
<td>.72</td>
<td>.88</td>
<td>1.07</td>
</tr>
</tbody>
</table>

* Significant at .10 level
Table 13 displays what appears to be consistent differences in performance by the subjects of Group IV and also consistent presence of interaction effect; that is, the intersecting lines appear to reflect interaction. Observed in conjunction with Table 12, however, only that proposition is supported which claims that interaction occurs only in the instance of GPA. The apparent effects are explained by the wide internal variability in the groups as seen in the sizes of the standard deviations, especially in CHE. In general, EPE levels had no impact on the criterion variables.

Table 13
Comparisons Between Persister (+) and Subjects of Groups I and IV (°) by Level of EPE Scores and Group Means of Three Criterion Variables.

<table>
<thead>
<tr>
<th>EPE</th>
<th>0-16</th>
<th>17-84</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Trachtman (1975) cites research in prediction studies employing the stepwise multiple regression procedure which combines cognitive and noncognitive attributes to predict effects on the criterion variable GPA after one year. Her concern centered around identifying variables that enabled counselors at Hunter College to predict academic performance of high risk students. Previous studies

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accounted for only 22 percent of the variability on GPA. Professor Trachtman sought methods to increase the prediction power with such noncognitive factors as "dogmatism" (vs. flexibility of beliefs and opinions), "alienation" (vs. sense of belonging and purposefulness), "externality" (vs. belief that personal effort produces favorable outcomes), "intellectual achievement responsibility" (vs. belief that academic achievement is in the control of others), and "self-esteem". Scores from instruments purported to measure these variables along with achievement scores in reading and mathematics were entered into a stepwise regression formula to measure the relative influence on the dependent variable, GPA. Results are summarized as follows:
Table 14

Summary of Trachtman's Stepwise Regression Formula of Various Noncognitive Factors as Related to Grade Point Average.

<table>
<thead>
<tr>
<th></th>
<th>Multiple r</th>
<th>$R^2$</th>
<th>Increase by percent of variability accounted for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total reading</td>
<td>.44</td>
<td>.20</td>
<td>.200</td>
</tr>
<tr>
<td>Attitudes toward authority</td>
<td>.50</td>
<td>.25</td>
<td>.050</td>
</tr>
<tr>
<td>Internality</td>
<td>.54</td>
<td>.29</td>
<td>.040</td>
</tr>
<tr>
<td>Dogmatism</td>
<td>.58</td>
<td>.34</td>
<td>.050</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>.60</td>
<td>.35</td>
<td>.010</td>
</tr>
<tr>
<td>Intellectual achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>responsibility</td>
<td>.62</td>
<td>.38</td>
<td>.030</td>
</tr>
<tr>
<td>Alienation</td>
<td>.62</td>
<td>.39</td>
<td>.005</td>
</tr>
<tr>
<td>Mathematics</td>
<td>.62</td>
<td>.39</td>
<td>.005</td>
</tr>
<tr>
<td>Sex and ethnicity</td>
<td>.62</td>
<td>.39</td>
<td>.001</td>
</tr>
</tbody>
</table>

Her study was consistent with other studies that typically accounted for approximately 40 percent of the variability within populations of underprepared students.

A central proposition under consideration in this study relates to the essential irrelevancy of such noncognitive characteristics to achievement: In effect, the quality of instruction, it is argued, compensates for whatever disadvantages may appear as a result of the
accidents of students' demographic or noncognitive circumstances. Transforming a populations' orientation, for example, from Internality to Externality or vice versa could be expected to affect the regression formula by only four percent. The results displayed by the following table are consistent with those of Trachtman.

Table 14 displays the correlations between individual demographic variables (r) and the percentage of variability (R²) each accounts for on each of the three dependent variables—Grade in ENG 110, CHE, and GPA. Further, the table presents the combined effects in rows designated "Multiple." On the criterion variable, Grade in ENG 110, the combined effects account for five percent (r² = 0.051) of the variability with the independent variables "Ethnicity" and "Sex" bearing the major weight of this effect. In the events of CHE and GPA, the table presents statistical evidence that no effects of the four independent variables were discernible.
Table 15

Summary of Stepwise Regression Analysis Procedure Using Four Noncognitive Student Characteristics—Sex, Age, Ethnicity, and High School from which Graduated—on three Criterion Variables.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Criterion Variable</th>
<th>n</th>
<th>r</th>
<th>$r^2$</th>
<th>probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td>ENG 110</td>
<td>482</td>
<td>0.18</td>
<td>0.034</td>
<td>0.000*</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.013</td>
<td>0.007*</td>
</tr>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td>0.04</td>
<td>0.002</td>
<td>0.135</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>0.04</td>
<td>0.002</td>
<td>0.618</td>
</tr>
<tr>
<td>Multiple</td>
<td>ENG 110</td>
<td>482</td>
<td>0.23</td>
<td>0.051</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>CHE</td>
<td>780</td>
<td>0.06</td>
<td>0.0030</td>
<td>0.202</td>
</tr>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td>0.06</td>
<td>0.0030</td>
<td>0.198</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.0006</td>
<td>0.485</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.0006</td>
<td>0.513</td>
</tr>
<tr>
<td>Multiple</td>
<td>CHE</td>
<td>780</td>
<td>0.08</td>
<td>0.0072</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>GPA</td>
<td>780</td>
<td>0.07</td>
<td>0.0046</td>
<td>0.202</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td>0.03</td>
<td>0.0008</td>
<td>0.382</td>
</tr>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td>0.01</td>
<td>0.0000</td>
<td>0.822</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>0.01</td>
<td>0.0001</td>
<td>0.885</td>
</tr>
<tr>
<td>Multiple</td>
<td>GPA</td>
<td>780</td>
<td>0.07</td>
<td>0.0055</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05 level
Summary of Results

The two hypotheses analyzed in this chapter were concerned with issues related to the effects of persistence and nonpersistence in the remedial English course at KVCC on three criterion variables, Grade in Freshman Writing (ENG 110), total credit hours earned over a two year period (CHE), and grade point average earned over that period (GPA). The first hypothesis attempted to demonstrate that the Persisters as a group systematically outperformed Nonpersisters on the three criterion variables. Statistical evidence was presented in the form of two factor ANOVA tables using the weighted means procedure that demonstrated that the two groups differed significantly on the three criterion variables. Especially important were the comparisons of the groups' performances on the variable ENG 110 since the objective of the remedial English course is to prepare students for success in freshman writing regardless of the extent of their diagnosed deficiencies. In addition to the presentation of statistical evidence demonstrating the groups' differences, numbers and percentages of subgroups' population were presented which showed that the likelihood of a Persister proceeding to ENG 110 was 2.8 to 1 over that of a Nonpersister.

The second hypothesis was a logical consequence of the first: If the Persisters outperformed Nonpersisters, were they also able to perform on a par with students diagnosed as having superior initial writing skills upon entry into ENG 110? The statistical evidence supports the proposition that no significant differences occurred.
between Persisters and subjects with adequate or superior initial writing skills. Further, compared to subjects diagnosed as having inadequate initial writing skills yet who enrolled without remedial help, Persisters apparently produced better results but not to an extent that was supported statistically.

Finally, the stepwise multiple regression analysis procedure was employed to determine the effects of various demographic data on performance as measured by Grade in ENG 110, CHE, and GPA. The table produced by the procedure displayed evidence that none of the demographics affected the criterion variables to any statistically measurable degree.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Higher education in the United States is faced with the dilemma of a decreasing population of traditional, college-aged students, and an inflated capacity to provide education. Simultaneously, groups previously underrepresented in higher education—e.g., ethnic minorities, the poor, single parents, older adults, i.e., nontraditional students—have been attracted to higher education as a result of both raised expectations and increased availability of opportunities afforded mainly by the community college movement. These forces in combination with a decided decline in academic preparedness within the traditional college-aged population have caused attention to be focused on so-called remedial or developmental education whose general purpose is to prepare the underprepared for the discipline and rigor of higher education.

Presently the marketplace of ideas is glutted with extant or projected models for treating perceived academic deficiencies, all of which are costly and few of which have been subjected to disciplined scrutiny. Despite avowed commitment to data based research, proponents of adult remedial education advocate such practices as direct treatment of such noncognitive pathologies as low self esteem and external locus of control without regard for their merit as means for preparing the underprepared for academic success.

Likewise, disciplines traditionally viewed as providers of basic
academic skills—reading, writing and arithmetic—are searching for models of pedagogy and content, themselves in various states of disarray unable to determine the perimeters of remedial instruction. Open questions remain as to what skills and subskills are employed in the writing process and in what order they should be attacked, and no consensus has emerged on issues related to methodology. Debates currently occur over pedagogical implications of such issues as whether or not the product of writing is a valid measure of the writer's proficiency, or whether or not the writing process provides an adequate model for pedagogical design, or what effects background and personality have on a writer's ability. As a result of the disorder in the discipline, each institution defines its objectives according to local standards, and results are measured in terms of gain scores on criterion referenced tests, attitude surveys, or product improvement depending on local criteria.

Decision makers have little reliable research on which to base allocation of scarce resources, and they are faced with problems unique in the history of higher education. As a social institution, higher education has acquired and developed resources to accommodate a far vaster traditional population than actually or potentially exists; consequently, colleges must either expand their constituencies to include formerly excluded groups or retrench. Since the former option is more likely, both philosophically and practically, the task of preparing underprepared constituents willy-nilly falls on higher education. For those colleges that embrace the task, critical decisions concerning the management of resources lie in wait. It was from this
perspective that this study was initiated. The perimeters of the
content and the design of the instructional model were factors poten­
tially affecting students' performance, and the structuring of the
research design offers decision makers a model by which to assess the
merit of competing systems. That is to say, systems of instruction
which lack solid theoretical underpinning and/or objective evidence of
efficacy should be viewed sceptically if not rejected entirely.

Purpose of the Study

This study examined relationships between persistence or
nonpersistence in a remedial PSI English course and subsequent
achievement over a two year period in a two-year college. The
subjects of the study were students diagnosed as displaying various
degrees of underpreparedness in basic writing skills on a criterion
referenced placement examination. The main issue of this study was
concerned with determining if evidence existed to affirm that students
persisting in the course designed after the so-called "Mastery Model"
advocated by Benjamin Bloom and John Carroll and the "Personalized
System of Instruction" originated by Fred Keller were prepared to deal
effectively with Freshman Writing. Closely related to the main issue
were two other issues: First, how powerful was the predictive
potential of either persistence or nonpersistence;
i.e., does persistence or nonpersistence in ENG 098 relate to achieve­
ment as measured by grades in Freshman Writing? Second, to what
extent could performance in other college related endeavors be
projected such as credit hours earned over a two year period and grade point average earned over the same period? It seemed reasonable to assume that if a sizeable portion of the persisting group proceeded to enroll in Freshman Writing and successfully navigated the course, efficacy of the ENG 098 experience would, to some extent, be documented. Further, if Persisters outperformed NonPersisters to a substantial extent, the case would be strengthened particularly if it were established that in other respects Persisters and NonPersisters were alike. Bases might then be formed which lead to refinements in the remedial program. These issues led to the formulation of the following hypotheses which were tested in this study:

**Hypothesis I.** Significant differences will occur between Persisters and NonPersisters in each of the three outcome measures—Grades in ENG 110, Credit Hours Earned, and overall GPA regardless of the extent of diagnosed difficulties in basic writing skills as measured by scores on the EPE.

**Hypothesis II.** No statistically significant difference will occur between Persisters (Group II) and subjects who were exempt from ENG 098 (Group I) in the following dependent variables: Grades in ENG 110, Credit Hours Earned, and GPA.

**Summary of Procedures**

The population consisted of 662 students who had enrolled in the remedial English course, ENG 098, at KVCC in the fall terms of 1979, 1980, and 1981. In addition to those enrolled in ENG 098, 112 students who chose to enroll directly in freshman writing without
remedial instruction were selected from the EPE files and entered into the study on the basis of the following criteria: (1) They had enrolled in ENG 110 in the fall terms of 1979, 1980, or 1981; (2) they had enrolled for 12 or more credit hours; (3) they had no remedial experiences at KVCC; (4) they were recommended either (a) to enroll in ENG 098 as a result of poor EPE scores (17 or higher) but chose to disregard the recommendation, or (b) to enroll in ENG 110 as a result of superior EPE scores (16 or less) and followed the recommendation. Thus were four discrete groups formed.

From KVCC's application records files then were drawn such demographic data as age, sex, ethnicity, high school and year of graduation. From the transcript files were drawn academic data including subsequent upper level English courses, grades in ENG 110, credit hours earned, and grade point average. Finally, from the ENG 098 files were drawn course grades for Persisters and Nonpersisters, pretest and postest scores, and numbers of units completed.

Findings

Comparisons between Persisters and Nonpersisters revealed substantial differences in subsequent performance. In the first place, Persisters enrolled in Freshman Writing by a 2.8 to 1 ratio over Nonpersisters. Once enrolled, the 274 Persisters averaged a grade of 2.84 in ENG 110 compared to an average of 1.49 earned by the 95 Nonpersisters. The fact that the Persisters' grades clustered closely around the mean regardless of the extent of initial writing deficiencies as measured by the EPE provides evidence that persistence
in ENG 098 relates to achievement in ENG 110. No matter how poorly
the Persisters performed initially on the EPE, their achievement in
ENG 110 was the same as classmates who scored better on the EPE.

On the other hand, Nonpersisters' grades trailed off from 1.76 to
1.00 as their EPE scores declined. This comparison further strengthens
the inference that mastery of the objectives of ENG 098 offsets the
effects of initial writing deficiencies while Nonpersisters are left
with the effects of inadequate writing skills.

In other outcome measures, Persisters also outperformed Nonpersis-
ters substantially. On the average, Persisters earned three times as
many credit hours as Nonpersisters. The less proficient students as
identified by the EPE likewise trailed off by this measure also while
Persisters' CHE remained consistent across all EPE levels.

Finally, a comparison of GPA revealed a similar pattern. Persis-
ters, regardless of initial EPE scores, clustered between 2.5 and 2.9
while Nonpersisters trailed off from 1.9 to 0.8 according to declining
EPE level.

Behind these findings, however, are considerations which deserve
discussion. The fact of perseverance itself is evidence of the presence
of that affective condition which Bloom and Carroll identify as neces-
sary for learning: the learner possesses the affective characteristic
required to persevere. From the data available in this study, it
is not possible to determine if those characteristics existed before
the PSI remedial experience or developed during it or were a result of
the experience. What is evident, however, is that the characteristic
is present in the group identified as Persisters and that it is absent
in the group identified as Nonpersisters. Furthermore, it appears to be present in the members of Groups I and IV as evidenced by their achievement in the three criterion variables.

**Persisters and Groups I and IV**

Persisters were compared with students who had no remedial experience. Subjects identified as Group I opted out of ENG 098 as a result of superior EPE scores (0-16). Subjects identified as Group IV chose to disregard the EPE recommendations despite inferior EPE scores (17-34) and enroll directly in ENG 110. While the 269 Persisters outperformed the group IV subjects by all criteria, the Persisters were themselves outperformed by the Group I subjects. In no event, however, were the comparisons statistically significant. In effect, these findings reenforce the proposition that Persisters, regardless of the extent of their initial writing deficiencies, subsequently perform on a par with students whose initial writing skills are judged superior. Had interaction effects occurred between EPE level and performance as measured by grades in ENG 110, CHE, or GPA an argument could be developed which attributed performance solely to initial skills level. Such a claim would credit the instructional program with the ability to distinguish more able students from their less able classmates and to award grades according to initial skills levels. The similarity in performance of the Persisters through all skills levels produces a virtually horizontal line on a graph showing performance by EPE level. The performances of Group I students were consistently and predictably above the line produced by Persisters;
and Group IV students' performances were consistently below all levels of Persisters' performances. Lines connecting the performance levels of Groups I and IV in all cases intersect those of the Persisters. Such a configuration graphically supports the proposition that interaction occurred between initial writing skills level and performance. Statistical evidence, however, does not support that proposition except in the case of GPA. The interaction effect of EPE score and presence or absence of remedial experience appears at the .04 level of probability only in the case of GPA; in both other performance measures, statistical evidence is weak. Such interaction effect implies both a longer range effect of persistence than was expected and an evident negative effect on Group IV subjects whose undeveloped writing skills may have reduced performance levels in subsequent course work.

The similarities in achievement between Persisters and Group IV, those subjects who opted out despite inferior EPE scores, undermine simple conclusions that the PSI remedial experience was the "cause" of the Persisters' subsequent success. Two observations should guide the thinking on this issue. First, the size of Group IV (n=34) represents seven percent of the population. This is a relatively small subpopulation whose members appear confident enough in their abilities to attempt more difficult work despite contrary evidence. Second, it might be argued that Group IV students possess sufficient affective characteristics for successful achievement, but that the variability within the group as evidenced by the size of the standard deviation (n= 34; s.d.=1.22) indicates a wider range of abilities than within
the Persisters (n=269; s.d.=.85). Persisters might be viewed as having achieved a more consistent level of writing skills. The disparities in group sizes and the differences in the distribution of grades in ENG 110 make comparisons tentative and provide direction for subsequent research.

**Demographic Effects**

The combined effects of available demographic data never accounted for more than five percent of the variability among the three criterion variables. It was only in the criterion variable ENG 110 that even that level was evident. The combined effects of sex and ethnicity accounted for 0.047 percent of the variability on that variable. Demographic traits appear irrelevant as contributors toward achievement in this study.

**Non-demographic Effects**

Since the available demographic data are ruled out as contributing even minimally to achievement, one is brought back to the effects of initial writing level and Persistence or Nonpersistence in ENG 098. In the case of ENG 098 and its effect on ENG 110, 26 percent of the variability is accounted for by ENG 098 alone. The extent of accountable variability is increased to 33 percent for CHE; and it is further increased to 55 percent for GPA. An especially salient issue here emerges: If the fact of persistence in ENG 098 accounts for 55 percent of the variability on GPA, a reasonably powerful prediction tool is available to those providing remedial instruction to underpre-
pared students. This fact in combination with what is known about completion rates of Nonpersisters, it is possible to identify with a high degree of accuracy those students who run the greatest risk of failure. The critical unit of the ENG 098 program appears to be Step IV: 83 percent of Nonpersisters quit prior to Step V; no one quits after Step X.

Implications and Conclusions

Program design. Of primary concern in this study was the effects of mastery of cognitive objectives on non cognitive behaviors. There is little doubt that the 53 percent who enrolled in and completed ENG 098 possess adequate personal motivation and will to succeed. Their persistence serves them well and is a powerful predictor of academic achievement at KVCC. Persisters appear adequately prepared for Freshman Writing whether or not as a result of the PSI remedial experience. The absence of data that relate cognitive behavior to affective behavior leaves open that issue. The primary goal of ENG 098—its main reason for existence—is cognitive development. If the Persisters were not so profoundly successful in ENG 110, the merit of the PSI remedial English course may be called into question; as it stands, the merit of the course is affirmed by the evidence.

The open issue involves those 47 percent who make up the Nonpersisters. Of that group 66 or ten percent never attended the orientation session. 122 or 18 percent of all enrollees completed zero steps of the course. That represents 28 percent of all students enrolled who possessed virtually no desire to engage in the course beyond
registration. Obviously, effects of the course cannot operate if the basic affective behavior—willingness to attend (a double meaning here intended)—does not occur. The problems associated with that behavior lie for the most part outside the the domain of the course design but within the domain of program design.

The remaining 124 students returned for completion of from one to ten steps. For this subgroup of 15 percent of all enrolled students, the course either failed to compete effectively with other forces operating in their lives or possibly posed difficulties beyond the students' abilities to cope. In some instances they may have determined by independent judgment that the course did not meet their needs. Whatever the motives that lay behind this subgroups' failure to persist, this 19 percent of the total enrolled group appears to be the subgroup upon whom the greatest gains can be made.

Recommendations

Since the status quo adequately serves 53 percent of the enrollees, and 28 percent cannot be reached by the course, it is recommended first that a more dynamic orientation be developed that contains at least two elements: a strong affective orientation that works toward students' goal setting behaviors, a data gathering component that provides more insight into traits of the Nonpersisters. Second, a content/structure feedback component should be developed that identifies specific content problems students face that might be alleviated by adjustments in sequencing of units or in simplification of course materials. Alternative instructional methods leading to
mastery should be set in place as a result of the feedback component.

Further Research

A great deal further information is needed about the effects of direct treatment of so-called dysfunctional affective behaviors and their effects on academic performance. This study suggests that not all students need tinkering with their affective behaviors. It would be wasteful of students' time and colleges' resources to march everyone through treatment when only 20 percent may benefit from it. Research efforts should be directed toward identifying those individuals and determining the most efficacious forms of treatment.
BIBLIOGRAPHY


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