

**The Many Faces of  
Developmental  
Education**

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Printed in the United States of America.

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# Foreword

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Dear Colleagues,

It is with great pride that I welcome you to the pages of the NADE 2000 Monograph. This publication is unique within our organization as it enables NADE members to share their research and practice with colleagues. As you take the time to read this significant work, you will find many connections to your own practice. At the same time, you will discover new ways of thinking about issues that may be confronting you. Why don't you consider sharing something from your own practice or research for next year's issue? It is an excellent way to develop our professional learning community.

The theme of this issue, "The Many Faces of Developmental Education," certainly reflects our field of practice. We come from a multitude of disciplinary backgrounds; we teach in a wide range of programs; and we regularly interact with extremely diverse students. Within our individual roles, we each represent a variety of faces under all those hats we wear: teacher, administrator, mentor, assessor, tutor, researcher, colleague, and politician to name a few. It really is difficult to narrow down our individual identities to only one role description.

Within this issue the range of our many faces becomes clear. With topics ranging from professional standards to students to pedagogy, it is easy to see that developmental educators are involved in a variety of areas. It is also apparent that the authors each have different ways of describing these areas. You will find interviews, case studies, a book review, and descriptive research. Once again, our many faces surface.

Please join me in expressing appreciation to the co-editors of the NADE Monograph. Pat Dwinell and Jeanne Higbee have done an excellent job of producing this publication for many years. It is a very time-consuming activity, and they both engage in it with a passion for professionalism and high standards. It is with deep regret that we accept the resignation of Pat Dwinell. The NADE Executive Board thanks Pat for the years she has devoted to the Monograph and wishes her well in her new endeavors. Fortunately for NADE, Jeanne will continue to edit this publication.

Enjoy. Settle in and engage in some critical reflection with your colleagues.

Martha E. Casazza

NADE President



# Introduction

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*Jeanne L. Higbee*

University of Minnesota

Co-Editor

**P**at Dwinell and I are pleased to share with the members of the National Association for Developmental Education (NADE) the best of the numerous stimulating and thought-provoking manuscripts that were submitted for the 2000 NADE monograph. In our call for submissions for this edition, we encouraged diversity in length, breadth, and subject matter. We sought chapters that would illustrate the many components of developmental education. We hope the reader will be pleased with the resulting combination of articles that extend beyond the traditional focus on reading, writing, and mathematics. We thank the members of the editorial board for reviewing the ever-increasing number of submissions and providing guidance not only to us as editors, but to the authors, whether their manuscripts were accepted for publication or not. One of our goals in initiating the NADE monograph series was to enhance professional development and encourage writing for publication in the field of developmental education. We appreciate the time the reviewers contribute to providing constructive feedback.

The first chapter of this monograph, authored by Gladys Shaw, provides an account of the emergence of professional standards for developmental educators. Shaw mentions the difficulty in evaluating a profession that encompasses such a wide scope of programs and services. Shaw's chapter is followed by interviews with two outstanding leaders in the field, Martha Maxwell and Deanna Martin, who have contributed so much to the profession.

## 2 THE MANY FACES OF DEVELOPMENTAL EDUCATION

In the next chapter, written by Lonna Smith, we are reminded of the diversity of the students we serve. More important, however, is Smith's acknowledgment of how we as educators can learn from our students. Although her characterizations at times appear almost "tongue in cheek," Smith's goal is to reinforce that we can not make assumptions about our students or stereotype them. Janice Trollinger's contribution to this monograph, "Mind Dance," is a description of an assignment that transcends cultures and enables students to explore from a unique perspective how people can work together to create something of beauty.

The next three chapters suggest various teaching methodologies for introductory courses in different disciplines offered within a developmental education setting. David Ghere presents a model for a developmental U.S. history course. He responds to potential criticisms regarding "lowering of expectations, dilution of course content, and loss of class time" by describing how he integrates skill development and good academic habits with content. Ghere explains how students become involved in the learning process through simulations and small group analyses of historical documents. Murray Jensen and Bobbie Rush's chapter describes the application of constructivism, cooperative learning, and Bloom's taxonomy of educational objectives to teaching a developmental biology course. They encourage mastery learning to enhance students' perceptions of themselves as learners, as well as conceptual learning to assure that students understand the material and are able to engage in higher level thinking skills such as analysis and evaluation. Thomas Brothen and Cathrine Wambach discuss personalized instruction and theoretical perspectives on feedback and self-regulated learning as the foundation for teaching a computer-assisted, mastery-oriented psychology course. Although most developmental education programs do not include courses in history, biology, and psychology, the same principles discussed in these chapters can be applied to other course content, such as developmental reading classes. Brothen and Wambach's work could also be used as a basis for developing courses for distance or on-line learning.

In their chapter, Jo Warner, Irene Duranczyk, and Elaine Richards describe a cooperative effort on the part of a developmental mathematics faculty to develop a program with consistent measures for placement and course achievement, while also providing the flexibility to meet the individual needs of students. This mathematics course sequence is similar to Brothen and Wambach's psychology course in that retesting allows for mastery learning, and that failure of a course is more likely to be related to nonacademic factors over which faculty and advisors have little control beyond making appropriate referrals. One unique characteristic of this program is that it employs only full time faculty to teach developmental mathematics.

This volume concludes with Martha Maxwell's review of Learning and Development: Making Connections to Enhance Teaching, by Sharon Silverman and Martha Casazza.

Finally, I must offer my tribute to another of the "many faces of developmental education," Patricia L. Dwinell, who has been my co-author and co-editor for many years. Pat served as assistant to the director, and then as associate director of the Division of Academic Assistance (previously Developmental Studies) at the University of Georgia for two decades until her retirement on December 1, 1999. Following her term as president of Georgia's state chapter of

NADE, Pat has remained active as an emeritus member of the organization's board, chairing special projects. Prior to co-chairing the NADE Monograph Committee since its inception, Pat served for two years as co-chair of the NADE Publications Committee, co-editing the conference proceedings, renaming them the Selected Conference Papers. Pat has mentored many evolving authors in the field of developmental education! My wish for Pat is many relaxing moments in her new home with her husband, David, time to enjoy her three daughters and ever-growing number of grandchildren, and time to revisit her many hobbies, including quilting and sewing, that have been "put on the back burner" for so long.

## 4 THE MANY FACES OF DEVELOPMENTAL EDUCATION

# Professional Standards: An Emerging Face Of Developmental Education

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*Gladys Shaw*

University of Texas - El Paso

## Abstract

*Moving into a new millennium is a good time to assess the status of standards in developmental education. More than just an “add-on” to the college experience, developmental education has evolved into an essential educational program governed by professional standards that validate and regulate the variety of services offered in this multi-faceted learning venue. These standards continue to be defined and refined as they become an integral part of the developmental education profession.*

Over its history, American higher education has adapted and reinvented itself repeatedly in response to social, economic, and political changes. Today new ways of envisioning and organizing academic life are emerging. This time around, however, the changes center less on building new institutional structures, redefining the curriculum, or expanding access, and more on the very heart of higher education—on improving teaching and learning (Angelo, 1997).

Angelo further states that Barr and Tagg (1995) characterize this as a very real paradigm shift from “providing instruction” to “producing learning.”

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## 6 THE MANY FACES OF DEVELOPMENTAL EDUCATION

Developmental education has always been about teaching and learning. However, it has not always been considered a profession, and it certainly was not self-regulated by professional standards until recently. Professionalism for developmental education has, in fact, been a long time “developing,” but it is now alive and well. Standards are being rapidly developed by professional organizations to validate and regulate its continued existence. The eve of the new millennium is a propitious time to look at where we have been and where we need to go with standards of practice.

As used here, the term “developmental education” includes academic support programs as well as courses, though in some states the terminology may vary in accordance with legislative whims. Professionals in both types of programs have been the pioneers in the standards movement. It would not be possible to pinpoint the specific moment when professional standards for developmental education surfaced for the first time in our collective consciousness. It appears in retrospect that several converging factors provided the impetus. Three of those factors were certainly the following: large numbers of nontraditional and underprepared students arriving at our institutional doors; institutions voicing moral and financial concerns about retention; and legislators and taxpayers requiring a higher level of accountability.

Additionally, the failure of instruction providers to produce learning, especially in our nontraditional student populations, fueled an increase in the number of practitioners in developmental education. As our practitioner numbers increased, so did our need to communicate and share in order to assess what we were doing and to learn new protocols. This sharing process, in turn, has resulted in very strong organizations for developmental education that have encouraged us to think and act professionally. An integral part of a profession is a set of self-governing standards; therefore, standards for developmental education are evolving both from the expanded need for what we do and the consequent need of practitioners to validate themselves as professionals.

One of the earliest movements in this direction came from the National Center for Developmental Education when in 1986 it awarded exemplary status to programs that met specified criteria. Then in 1989 a committee of members of the College Reading and Learning Association (CRLA), under the able leadership of Tom Gier and Karan Hancock, launched an International Tutor Certification Program for tutor training. This program was based on three years of research and input from practicing professionals. From a humble beginning of seven initial programs, the tutor certification program now has over 400 tutor training programs certified across the United States and Canada.

The Council for the Advancement of Standards in Higher Education (CAS) published their Self-Assessment Guides in 1986 (Miller, 1986). This seminal effort catalyzed developmental education into action both with its very positive elements and its glaring omissions. Developmental education professionals found that CAS standards provided a very workable format for self-assessments, but did not address four essential components of our programs: tutoring, adjunct skills programs, developmental courses, and teaching-learning activities. The response was proactive. Susan Clark-Thayer, Georgine Materniak, and a committee of members

of the National Association for Developmental Education (NADE) began the challenging task of developing similar standards for the areas omitted by CAS. After approximately six years of hard work getting input from practicing professionals, the efforts of the committee culminated in the NADE Self-Evaluation Guides (Clark-Thayer, 1995).

At this point, members of NADE's Professional Standards and Evaluation Committee became concerned about the potential duplication of effort if every professional organization decided to "do its own thing" with regard to standards. A council of professional organizations was proposed to serve as a clearinghouse for organizational initiatives to insure that standards would be developed to serve the profession rather than just an organization, and to avoid unnecessary replication. Thus was born the American Council for Developmental Education Associations. Hunter Boylan, director of the National Center for Developmental Education at Appalachian State University, kindly consented to chair this council and steer it through its infancy. The profession is finding that the council not only serves as a clearinghouse for organizational initiatives, but that it also provides a united voice for the endorsement of standards and serendipitously provides a forum in which we can develop consensus on other issues affecting developmental education.

Just in the last year, CRLA has implemented standards for training peer mentors, and the National Tutoring Association (NTA) has begun certification of professional tutors. In progress are NADE's certification of program components and its study of salaries, status, and preparation of developmental educators, which is intended to provide a fifth self-assessment guide. Potential areas for the future development of standards include computer-assisted instruction, distance learning, training for Supplemental Instruction (SI) leaders, and services for students with disabilities.

Although professional standards are still an emerging face of developmental education, we have made significant progress, and it is a living process. Now that we are, indeed, a profession, we must keep our existing standards current with change, establish standards not yet in place for existing services, and be vigilant for the future. As higher education reinvents itself in the next few years, we should not only be alert to the potential need for new services for students but also to the need to develop high standards for those new services.

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## 8 THE MANY FACES OF DEVELOPMENTAL EDUCATION

## Martha Maxwell: An Oral History

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During her extensive career, Martha Maxwell founded programs at American University, the University of Maryland, and the University of California at Berkeley. Since retiring from Berkeley in 1979, she has continued to write and work as a consultant, lecturer, and mentor. In addition to more than 150 articles in professional publications, she has authored numerous books, including Improving Student Learning Skills (1979, 1997), Evaluating Academic Skills Programs: A Source Book (1991, 1996), When Tutor Meets Student (1994), and From Access to Success: A Book of Readings on College Developmental Education and Learning Assistance Programs (1994). Maxwell remains active in a variety of professional organizations and has been honored for her research and contributions to the field of developmental education by both the National Association for Developmental Education (NADE) and the College Reading and Learning Association (CRLA).

Martha's youngest granddaughter, Anne Failman, is a freshman at Duke University and is an expert on oral history, having published a book last year on the oral history of a Maryland silk mill. The following is her advice to her grandmother on giving an oral history:

Well, I hope your oral history went well. I have a comment to make. Mom said that you did not think that your life was very exciting or something to that extent. Well, I beg to differ! You did so many different and amazing things, and you still continue to do them. The Amazon and New Guinea? And Berkeley, growing up as a military daughter, playing the piano (very well, I might add), going to Russia, taking courses in college that you were not supposed to take, being an awesome grandmother, writing books, and many other exciting and interesting things, that I do not feel like typing. But most of all what makes your life extraordinary is that you have brought so much joy and laughter to many people (me being one of them). You go out of your way to make everyone feel like their life is special and

extraordinary. You offer heartfelt advice and you are not afraid to speak your mind. So when you were interviewed, I hope that you talked about all of these wonderful things that you do and have done throughout your life.

Surely anyone who has worked with Martha would agree!

**Interviewer:** How did you become interested in developmental education? Was it intentional or just a matter of circumstance? Did you have a mentor?

**Martha:** After graduating from college in 1946 as a psychology and economics major, I entered graduate school in counseling. This was a period when returning GIs from World War II were going to college supported by the GI Bill, so the federal government also funded counseling services for GIs. Most of the clients I counseled were ex-GIs hoping to enter college. The GI Bill gave them career possibilities that they had never considered before. Many of these students desperately needed to improve their study skills. So I worked with study problems as well as counseling clients who were making educational and career decisions.

After finishing my master's degree at Maryland, I accepted a job at the American University's (AU) Counseling Center, where I was told that my work also included teaching a night course in reading improvement for adults. Fortunately, Dr. Smith had been teaching that course and handed me his notes on 3x5 cards. (Note: He had been paid through Extension. I taught evenings in addition to my full-time job without extra pay.) Although I had no courses in reading, I was told I had to teach it as part of my job. AU offered me a hefty \$3,000 a year for 12 months, and I couldn't afford to turn it down, so I agreed to teach the course. A few months later AU's president asked me to set up a reading and study skills center as he felt AU's students needed to improve their reading.

**Interviewer:** How has the field of developmental education changed? What directions do you see for the future?

**Martha:** Fifty years ago colleges and universities were segregated, so the underprepared students in White colleges were White and those in Black colleges were Black. Certainly fewer high school graduates went to colleges in the 1930s when I was a freshman, only 10 % compared to the more than 60 % now. There have always been underprepared college students, but today we have many more of them.

In terms of courses and content, the field has changed surprisingly little. Entering freshmen still bring the same kinds of problems to college and college success courses (we used to call them college orientation courses) provide help in the same areas: time management, the difference between high school and college demands, exam skills, planning careers, reading textbooks, counseling, and so on.

Even the programs themselves have changed little. In 1948 the University of Maryland, following the lead of the University of Minnesota's General College, began a program for students who were admitted on probation, those whose high school grade point averages (HSGPAs) were below 2.0. At the time, most of those admitted to the program called "Special and Continuing Studies" (part of the Extension College) were returning GIs, who were required

to take a limited course load and a course in study skills their first semester and attain a 2.5 average to get off trial (i.e., be admitted to a regular college). Those not making it the first semester remained on trial and took a reading improvement course their second semester and continued until they earned a 2.0 overall average. Along with the required courses, on trial students were counseled, advised, and offered tutoring in the regular courses they were taking.

We used Frank Robinson's book *Effective Study* as the text in the study skills course. Most of the topics and strategies suggested were very similar to those in texts today, although there was more emphasis on Robinson's SQ3R method of textbook reading and we did not talk about metacognitive processes per se because no one had written about them at that point.

In the reading course, we used a text by Glock with reading exercises on a variety of needed skills that required a student to keep records of his or her progress. Although at that point metacognitive processes were not known, the instructors tried to get students to become aware of what they were doing while they read and the different reading skills required by different disciplines. Since the students were also enrolled in either Sociology 1 or Government and Politics, we built exercises and designed strategies to improve their reading in those courses.

In the old days we had fewer professional associations. The College Reading Association and the National Reading Conference started in the late '50s. However, then as now, most of the members were newcomers to the field. About half had never had a reading or study skills course.

**Interviewer:** What new directions do you foresee in the future?

**Martha:** We need to drastically change our attitudes or else write the requiem for developmental education. The way most of our programs are designed and run, they stigmatize students who enroll in them and draw negative reactions from faculty in other disciplines. That is, developmental education is seen as a series of remedial courses reluctantly tolerated by administrators, considered a waste of money by faculty, who resent money being spent on students who don't belong in college, and detested by students who equate taking developmental education courses with being dumb.

Continuing to offer required stand-alone skills courses just leads to a negative, self-fulfilling prophecy. History reveals that colleges frequently admitted larger numbers of underprepared students when they needed money; when enrollments increased they buried the programs, in some cases by just renaming and renumbering the courses.

We know what to do, but policy makers steadily ignore the results of research. There are many better ways to help underprepared students thrive in college without the stigma they face in developmental education. Many of the programs and strategies developed for regular students work equally well for underprepared students. For example, let these students take real courses and provide intensive help as needed through paired courses, Supplemental Instruction (SI), extra sessions of intensive practice such as Treisman's Emerging Scholar's Program, collaborative learning, learning communities, and so on.

Stop teaching ersatz courses. Give the students courses with content that will challenge their ability and improve their self-confidence, rather than requiring them to take watered-down, simplistic, nonsense courses.

**Interviewer:** You have voiced your concern that people do not understand what developmental education is. Do you think this is true within the profession as well as among others?

**Martha:** Yes. I would be interested in a survey among instructors that shows how they define the field and their jobs. I suspect they would have a very narrow definition of what it is and how it would best work. A basic problem is that new teachers enter the field each year without training or preparation or experience in working with college students, naïve about what college literacy involves. Too often they lack mentors and have to learn on the job. Those who get involved on e-mail discussions like LRNASST and attend conferences have an advantage, but I suspect that the majority of developmental education teachers are not associated with professional organizations.

**Interviewer:** You have commented that developmental education can be too easily confused with “developmental disabilities.” Do you have any ideas regarding a more appropriate label for what we do that is less likely to cause confusion?

**Martha:** I feel very strongly that the term “developmental student” puts a pejorative label on students taking the courses, reducing their self-confidence and motivation. There are a large number of studies on developmental reading courses that support this. Not only don’t they do what they promise, but taking these courses may have negative effects on students—increasing drop-out rates, lowering self-esteem, and slowing progress toward graduation.

Yes, stop labeling students. Regardless what euphemism you choose, they are still considered dumb, and different, as if they were Martians, not humans. If you believe as I do that students vary in knowledge and skills on a continuum, then you can think of them as if they were just on different levels and could, if they choose, improve. Any label you use translates as “dumb.”

Educators and policy makers underestimate how much students feel stigmatized when they are forced to take a developmental course in college. Furthermore, this humiliation affects attitudes of their instructors, who sometimes share the feeling that they are second-class citizens. College students perceive taking a required remedial reading course as more shameful and punitive than taking similar courses in writing and mathematics, perhaps because people associate learning to read with what one learns in first grade. Or perhaps being forced to take a college reading course is more painful because unlike math and writing, reading courses do not fit into any discipline or department; indeed, reading skill underlies them all. At any rate, the stigma of taking a course for dummies serves as a major deterrent for aspiring college students with poor reading skills. Labeling the course as remedial or developmental worsens the problem.

Students who need to improve their skills should focus on success and how to get there, not on their past failures.

**Interviewer:** Do you have any recommendations you would make to new professionals in the field of developmental education?

**Martha:** I'd recommend that they build their backgrounds and improve their skills in counseling, and in pinpointing the learning skills needed in studying different academic subjects. Experience in Supplemental Instruction would certainly help. Also they should gain experience in training tutors and student mentors as well as working closely with faculty in different academic disciplines to better understand faculty goals and their criteria for grading. It is important to have experience with successful students, too.

**Interviewer:** Do you have any particular stories of successful students you would like to share?

**Martha:** What I recall most are the ingenious ways learning disabled students found to cope with their learning tasks – such as the poor speller who hired the forestry department secretary to type his papers. The papers were always excellent, but it was the spelling that he was unable to correct that lowered his grade. Or the graduate student with masters degrees in Greek and Hebrew who needed an extra 10 minutes to proof his written exams and make corrections. He said he had not learned to read until he was 9 years old. Many of these students worked much harder and longer on their assignments than did ordinary students; they'd buy their fall textbooks in the spring so they could read them over the summer.

Also students' insights about college work were interesting. One whom I asked about what it took to get through his first semester said "Spongeability – the ability to bounce back when things don't go the way you think they should." Sometimes they were adamant about their college plans – one kept complaining, "Why should I take political science when I'm going to law school!" At last, when he finally reached law school he was reasonable enough to admit that "Now I know why I had to take political science."

**Interviewer:** I wish more of my students would come to that realization! Thank you, Martha!



# Student Empowerment and an Expanded View of Developmental Education: An Interview with Deanna C. Martin

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**D**eanna Martin has served the field of developmental education for more than a quarter century. At the University of Missouri-Kansas City, Martin served as the Director of the Center for Academic Development, Director of the Center for Supplemental Instruction (SI), and Associate Professor in the School of Education. Martin created both Supplemental Instruction and its offspring, Video-based Supplemental Instruction (VSI). Her scholarly and professional contributions include numerous publications, research studies, conference keynote presentations, consultations, and training workshops with faculty and staff worldwide. Additional publications by Martin are available at the SI/VSI website (<http://www.umkc.edu/cad/si/>).

This interview provides an opportunity for her to reflect on her perspectives on the past and future of developmental education.

**Interviewer:** The editors of the this monograph tell me that the publication will deal with “the many faces of developmental education.” As one who has been involved centrally in this field for a quarter century, why don’t you give us your view of the future of developmental education?

**Deanna:** Many talk about “developmental education” as if educators agreed on its meaning, but the title of the monograph implies the reverse. There really are widely diverging views.

Development of whom or what? Development for whom? Development for what purpose? I have my own set of answers, of course, just as others have theirs.

**Interviewer:** Let's start with "development." How do you define that term?

**Deanna:** I see development as a process that all humans engage in from birth to death. All of us are in various stages of development throughout our lives.

**Interviewer:** Where do you see this developmental process leading us?

**Deanna:** In one sense, of course, one might see that as the existential question: since a lifetime of development leads only to the grave, why bother? The existentialist answer might be that it is the one great creative opportunity given to each individual, to create oneself in a form that pleases her or him. Or others may choose a more spiritual answer, "to fulfill God's plan for our lives," or the more materialistic answer, "to realize our full potential as individual human beings."

**Interviewer:** How do you see development in the philosophic sense tying in with development of academic skills?

**Deanna:** First of all, I don't actually differentiate between academic skills and life skills. Think about what both require. In each situation, we need to think and to articulate our thoughts clearly, inquire into things we don't understand, understand the difference between knowing and not knowing, plan a reasonable course of action, work efficiently to reach a conclusion, know where to find help when we need it, keep an open mind . . .

**Interviewer:** You are saying that in your view, the skills of academia carry over into life.

**Deanna:** They are the same skills, although they often go by different names and present in different guises. For example, notetaking, an academic skill, has a place in non-academic life. An elderly friend of mine recently observed that her notetaking and filing skills had improved a great deal, now that her memory is becoming less accurate. Notetaking aids recall and planning, whether in the academic world or outside it.

**Interviewer:** Carrying that a bit further, would you agree that what we are really talking about is the meta-skill of problem solving? Notetaking being one part?

**Deanna:** You have it. Problem solving, or critical thinking. It is difficult to pin down something as abstract as a sphere of intelligent action and pin a label on it. I see the skills of recalling, organizing, planning, and executing a plan—all of those—as part of the process.

**Interviewer:** Reading is another aspect of the process? Of what you are calling "a sphere of intelligent action?"

**Deanna:** Sure. Research and inquiry are aspects of executing a plan, and reading is one way of researching a subject. There are many others.

**Interviewer:** Like what?

**Deanna:** Most people don't read as their first resort when researching a subject. More likely, they ask someone else, using verbal inquiry to narrow the field of inquiry and then to read when they have exhausted their other resources.

**Interviewer:** Isn't that the approach that underlies Supplemental Instruction (SI), the support system you developed at UMKC? Helping students to identify the skills they need to meet the requirements of an academic course? And then helping them to acquire those skills?

**Deanna:** The key in the SI approach is student empowerment. Focusing on "empowerment" sounds like a cliché today, but it was radical stuff in the early 1970s. Letting the student determine the skills she needs to work on is central to empowerment. Otherwise, students tend to go through the motions, seeing the activity as an end in itself rather than as a part of the process. Seeing it as the teacher's or leader's agenda rather than their own.

**Interviewer:** You are saying that you see empowerment as the goal of developmental education.

**Deanna:** That takes us back to your original question. Some in our field would restrict the definition of "development" to the development of skills: reading, writing, notetaking—whatever those skills are.

**Interviewer:** I take it that you don't agree.

**Deanna:** I don't agree that those skills are ends in themselves. I don't agree that they can be taught in isolation from the setting in which students will use them. I agree that for a student to become self-actualized in academia, the student may need to acquire or develop or sharpen those areas, but it is for the student to come to that realization, not for an agent of the institution to impose that judgment.

**Interviewer:** How is the student to know which skills are deficient? It is common practice in our field to test students' competency in various skills and then to direct the student into remedial or developmental tracks where the student will develop the skills. Do you share that view?

**Deanna:** Not at all. Would you like me to expand on that issue?

**Interviewer:** By all means.

**Deanna:** Educational research in this century has followed a reductionist pathway. Researchers have sought smaller and smaller entities as the objects of their study.

**Interviewer:** An example?

**Deanna:** As a doctoral student, I was told by one of my professors that he had two pieces of advice: "Limit your dissertation topic to the eyelash of a gnat, and keep your eye on the hood." I have no reason to think my advisor was unique; in fact, my informal survey suggests that others received much the same advice: to choose something narrow and do-able. Save your "big ideas" for later, after the Ph.D. That was nearly a litany.

**Interviewer:** And you think that led the field to a reductionist pathway?

**Deanna:** If you multiply that one advisor by hundreds, and the one student by tens, then you have expansion by three orders of magnitude. And when you add that publication largely relies on statistical evidence and when most of the research in our field seeks correlation among variables like test scores and outcomes, then reductionism seems to me to be inevitable.

**Interviewer:** Let's get back to the question of testing. Why not test?

**Deanna:** First, we have little solid evidence that the factors we test for make any real difference. Reading? Poor readers have done well in the university. They probably don't major in literature or philosophy, but they don't have to.

**Interviewer:** There are subjects for which one needs prior knowledge or mastery. Physics of motion, for example, requires understanding of vectors. Chemistry requires balancing equations and understanding logarithms.

**Deanna:** True, and I have no problem with that kind of testing. The testing I question is the assessment leading to placement. If testing leads to advising students, to involving them in planning their coursework, then I have no objection. I object to what has become an industry of placement testing. Engaging a student in a discussion of test results is quite different from denying a student enrollment in a chemistry class because she missed the cutoff score on a math test.

**Interviewer:** So it isn't so much the testing you object to; rather you object to the use of testing to mandate curricula.

**Deanna:** I object to setting any limitation on the human spirit. Is that too esoteric? I don't believe anyone has the right to limit the aspirations of another, and that is in fact what happens to many students, especially if they are poor, when they are denied access to the regular curriculum and shunted instead into a track that doesn't lead to a degree. Middle class students are more apt to have the time and money to divert into a developmental track. Poor students are more likely to agree that they need better skills, but all too often they fail to appear when classes start or drop out within the first few weeks.

**Interviewer:** Then you must have an idea of how to teach chemistry, for example, to someone who doesn't know how to balance an equation, or history to a student with poor reading skills.

**Deanna:** Yes, I have. But first, I want to tell a story about the work one of my Center colleagues did with the economics faculty. My colleague had been coordinating the campus SI program and had personally been conducting the SI sessions in economics. Historically, economics had a high failure rate and the faculty wanted to develop a pretest for macroeconomics. The Center staff member offered to help them.

Working with the economics faculty, he developed a pretest of 21 questions based on 6 or 7 skills that the faculty all agreed were prerequisites to the study of economics. The skills included the following: (a) read a definition taken from the first chapter of their text and then pick an example of the definition from a group of 5; (b) read a paragraph from the first chapter of the

textbook and pick the subject of the paragraph from a group of 5; (c) find a bit of data on a table; (d) read a line graph; (e) read a bar graph; (f) calculate the slope of a line in terms of Cartesian coordinates; and (g) solve a simple algebra problem. That was about it. The faculty agreed that any student who missed any item on the test would be in trouble, and that we might pre-teach the concepts for students who showed weakness in any area.

**Interviewer:** You thought that any student who missed any question would have trouble with the course?

**Deanna:** That's what the faculty thought. That is not what the staff member thought. When he administered the test on the first day of class, we all learned that not one student in the class of 100 answered all questions correctly. But what he did next, that was stunning. On a hunch, he administered the exam to the students across the hall in the second economics course. They were all students who had declared their major in engineering, economics, or business. They had also earned grades of C or better in the first course. When the second set of pretests was scored, the results were nearly identical. Not only did the students not have those skills when they went into the first course; they didn't have them when they emerged with passing grades!

**Interviewer:** Why tell that story?

**Deanna:** To illustrate that it isn't easy to prescribe in the academic setting. And, of course, that is my point about placement tests.

**Interviewer:** And you are arguing that testing is reductionism in practice. But what is the alternative to reductionism?

**Deanna:** Holistic education.

**Interviewer:** Do you mean by that what methods books sometimes refer to as the concept of "the whole child?" Education faculty remind us frequently that we are involved with "the whole child," and not simply the child's mind. Is that what you mean?

**Deanna:** I believe I'm coming at it a bit differently. I'm coming at it from the perspective of medical science, and particularly research in neurophysiology.

**Interviewer:** Are you referring to the research you and your associates did on brain electrical activity (EEG) in the early 90s?

**Deanna:** That was certainly where we started, and I think we were on the right track. Our hypothesis was rooted in a concept of neuroplasticity—the idea that the brain continues to develop after birth. We thought that an enriched intellectual environment might generate synaptic proliferation, an increase in neural connections, and actual changes in the structure of the brain. We were working with medical students from all over the U.S. to get them ready for their national board exams. Most of them had been sent to us by the deans of their school because they had failed the exam, some of them several times. The deans wanted the students to pass and graduate but had been unsuccessful at determining what had gone wrong.

We set up a six-month-long board preparation program which occupied students in scheduled activities from 7 a.m. until 9 p.m. daily, six and a half days a week. That included time

for meals, for exercise, and for massage. They lived and worked together. They had no scheduled activities Saturday evening nor Sunday morning.

**Interviewer:** What did you do with them all those hours? Were they in classes?

**Deanna:** First of all, we are neither sadists nor masochists. None of us wanted a schedule like that. The students forced us into it. They simply wouldn't go home. They were waiting for us at 6 a.m. They demanded keys to the building. They were still there at 11 o'clock at night, working in their small groups. Actually, they were only in lecture about four hours a day. We rarely put them in whole courses. Rather, we developed mini-courses consisting of what we thought of as the critical units of instruction within the seven basic sciences of their medical curriculum. The rest of the time was spent either getting ready for the lectures (preview) or de-briefing the lectures (SI). Then there were daily question groups where students practiced reading, interpreting, and answering board-type questions. Most of the day students were immersed in dialogue: they were talking, listening, comparing information, arguing, working problems out on the board, drawing diagrams. In short, they were figuring things out. They were self-correcting, self-modifying.

In all phases of the program, we involved the students closely in setting their short-term goals. Their long-term goal, of course, was to pass the test. Our long-term goal was to prepare them for a lifetime of studying and preparing for the tests that characterize the medical profession: boards, in-training exams, specialty boards, re-certification. We thought of all this as holistic education. Certainly, it was developmental.

**Interviewer:** How specifically did the EEG studies fit in?

**Deanna:** The EEG was part of our three-day diagnostic workup on students. We were particularly interested to see if the studies revealed changes in inter-hemispheric coherence patterns. In one study we found that over the course of the six-month program, those students who had been previously diagnosed as Attention Deficit Disordered (ADD) showed brain activity patterns that came to more closely resemble those of the other students. The brainwave patterns of the ADD students were significantly different from the rest of the students when they first came to the program.

**Interviewer:** Did these students pass their exams?

**Deanna:** Yes, of course. Our success rate with the whole population exceeded 90%. Inevitably, our work attracted for-profit imitators, although none of them were able to surpass our early achievements. It may be of interest to note that the national success rate on retest in those days was in the neighborhood of 15%. However, for our overall population of students who were predominately minority and who had failed the test multiple times, the predicted pass rate was negligible.

**Interviewer:** Working with students that long and for so many hours a day must have been a very rewarding, if not exhausting, experience. What did you learn from this experience?

**Deanna:** We learned volumes. This work more than any other shaped our understanding of the devastating effects of tests designed to exclude. National boards in medicine are forced failure exams. No matter how well everyone does, ten or more percent will fail by design. It also taught us that given the opportunity and the appropriate support, students can transform themselves. They can discover what they need to do and they can do it against all odds.

**Interviewer:** But these are, after all, medical students, the so-called “cream of the crop.” Can you really compare them to the more typical students we see in developmental education?

**Deanna:** I know it flies in the face of what seems reasonable, but our experience is that the problems these students have are not unlike the problems that all students have, from adolescence onward. The problems don’t differ very much in kind. They differ in the level of sophistication. The material is more difficult and the stakes are higher, but the problems are all the ones we already know: reading, mathematics, proportional reasoning, planning, problem solving, listening, egocentrism....

**Interviewer:** What was the most satisfying part for you?

**Deanna:** Seeing the transformation. We even had parents and spouses call and say, “What did you do? My son [or daughter or spouse] came back a different person.” But in truth we didn’t do anything to them. They did it themselves. We created the opening for change. We also held the faith for them when they could not hold it for themselves. I think that was important. Another thing that made a profound impact on us was to hear the comment we often heard from students: “For the first time since I began to study medicine, I have the time to understand what I know.” That phrase drove home to us the futility of these students’ previous efforts to learn from hour after hour of lecture. Our universities still create that same kind of a hostile environment for many students.

**Interviewer:** Getting back to the EEG question, were you doing with the electroencephalogram what others are doing with Positive Emission Tomography (PET) scans and super high tech equipment?

**Deanna:** Indeed, we were trying. We had neither the resources nor the staff to permit the use of PET, but contemporary researchers are validating our hypothesis. Studies of neuroplasticity that Manfred Spitzer reports from the University of Ulm in Germany demonstrate that the brain continues to develop long past childhood. The research of Hannah and Antonio Damasio at the University of Iowa adds a major dimension to the field, as well. Their studies of consciousness set an entirely new direction for education of all students, not just those engaged in “developmental education.”

**Interviewer:** You apparently think of this as a new development.

**Deanna:** Let me get historical for a moment. Education is emerging from ages dominated by the thinking of Copernicus, Galileo, and Newton—the idea of a mechanical universe, in which everything moved and behaved according to a predetermined set of parameters. More recently, educators have talked of people in terms of yet another mechanism—the computer. People could be programmed to behave in this or that way.

The discoveries of quantum physics recognize that the smallest units of matter are not matter at all but are quanta of energy. The development of chaos theory recognizes certain non-random variations in events previously thought to be totally random. And then there is the research that suggests that consciousness is not only a property of the mind but of all living cells. These among other developments must change the way we educators think of our tasks. Education must take notice of these new areas of research because they stand on its head the idea of the student as a programmable entity, a *tabula rasa* in Rousseau's thinking.

**Interviewer:** How do you see educators responding to these changes?

**Deanna:** I don't know. This is a new frontier for science. Only now are the articles beginning to pour in. But of this I feel certain: Manfred Spitzer has, with neurophysiological observation, largely validated the view of Piaget that learning is a developmental process, and that in that sense, all education is developmental.

Assimilation precedes accommodation, and learning must proceed from assimilation of what is new into an existing framework. I know that also sounds mechanistic, but I don't know just now how else to express it.

**Interviewer:** As I hear you talking, I understand that you see SI as a way of teaching that is consistent with the new discoveries you mentioned.

**Deanna:** Ironically, SI first won recognition from those who hold the mechanistic view. University administrators on my own campus saw that students persisted longer in the university and graduated at a higher rate when we added SI to the curriculum. If they were interested in the fulfillment of students' potential, they didn't say so. They responded to the data that showed a cash return that was greater than the money invested in the program. For administrators, most of whom were engineers or MBAs, that fact had charm. They saw that SI paid dividends, and they liked it for that reason.

**Interviewer:** And you? Did you like it for that reason?

**Deanna:** I liked it for what I thought it did to help students develop their own potential. I sold it, however, on the basis that it was a cost effective and powerful retention tool.

**Interviewer:** Now you have gone on to develop what you call Video-based Supplemental Instruction (VSI). Can you talk about that for a moment? Has VSI the same roots as SI?

**Deanna:** Yes, basically. VSI comes from the thinking of Jerome Bruner in the 1960s. He taught us that anything can be taught in some intellectually honest manner to anyone. In that, he was one of the first to reject the idea that the human mind had some mechanical limits. I think that was one of the most significant statements by an educator in our time, recognizing that even the most immature mind is infinite. We translated that into "What one person knows, another can learn."

**Interviewer:** Well, how do you see the Internet and on-line education fitting into the picture? Will you participate in that?

**Deanna:** Sure. We are participating in it now with VSI and other distance education opportunities. But for the most part, I see the use of education on the Internet representing yet another exclusionary mode. It has been 50 years, nearly, since *Brown vs. Board of Education* in Topeka, and now here we are again, with a separate but equal system. In that sense, Internet-based education is regressive. It favors the wealthy and those who have self-actualized as independent learners. It operates at the expense of the poor and those most in need of personal development.

**Interviewer:** There are some who appear to be disadvantaged in net-based education as much as in the traditional system.

**Deanna:** Exactly. When I ask those involved in on-line education what percentage of failures they encounter, they respond with euphemisms. They don't have failures; they have "noncompleters." It is of course the same story as with correspondence schools of old. They never had failures, although the rate of noncompleters ran as high as 90%.

**Interviewer:** You mentioned VSI. How does VSI fit into your concept of developmental education?

**Deanna:** It recognizes that small groups of motivated people, working together with mutual respect, can master the most difficult academic disciplines. Again, this is the same scenario as with the medical students.

**Interviewer:** And you do this without a teacher?

**Deanna:** We have both a teacher and a facilitator. The teacher's lectures, however, are on video. If we are using VSI for a whole course, introductory physics for example, we ask the professor to work with us to place his lectures on tape. We build into the tapes such things as preview activities to get the students ready to respond positively to the lecture; periodic stops for activities and discussion at pivotal junctures during the lecture; and stops for reviews and test taking preparation after a lecture is complete. In other words, the transmission of information proceeds at a rate no faster than students are prepared to understand.

While the course mirrors the same rigorous standards as the traditional lecture sections, extended time allows the facilitator to "back-fill" the basic information that students may need in order to compete favorably with students in the regular sections of the professor's course. In short, the VSI model attempts to integrate the basic knowledge and skills students need for mastery of core curriculum courses while students are enrolled in the course itself. We see this as a sensible way to mainstream developmental education into the core curriculum. It maintains the high standards that faculty strive for while it gives less prepared students the time and support they need to excel.

**Interviewer:** Excel?

**Deanna:** Yes. Students who might otherwise fail or perform poorly (or who have already done so in the past) earn As and Bs for the most part. Grades below C are rare.

**Interviewer:** How do you explain that?

**Deanna:** I believed when we developed this process, and I believe even more firmly now, that learning occurs when the groups of students are trying to assimilate the lecture material, helping each other to understand. Again, this goes back to Piaget and Spitzer's more recent research that I mentioned.

**Interviewer:** I understand that you have tried VSI on your own campus. Have you tried it in other venues?

**Deanna:** We've tried the same form in a variety of settings with several different groups of students: rural Midwestern high school students, urban South Africans trying to access the local university, and urban American underachievers. The subjects ranged from chemistry, physiology, and physics to western civilization, accounting, and mathematics. Most recently, we have offered arithmetic in third and fourth grades in the inner city.

**Interviewer:** You mentioned South Africa. I know you have established programs as well in Europe, Australia, and the Caribbean. Why do you think your work has had such a reception in other parts of the world?

**Deanna:** For the same reasons as in the U.S. Among administrators, the retention and graduation rates are important. Among mid-level administrators and faculty, the issue of student development seems paramount. In South Africa, however, the story is different. In that troubled nation, the administrators of the previously White, apartheid institutions recognize the need to transform their universities. Changing attitudes toward students—especially students from the Black majority—is a key part of that transformation process. SI has been effective not only as an academic support program and a retention tool, but it has provided an opening for students to study together and get to know one another. At last count, SI now operates on some 30 South African campuses. Many more are signed up for training by staff from the University of Port Elizabeth, our central training site for sub-equatorial Africa.

**Interviewer:** I know you have recently stepped down from the directorship of the Center for Academic Development. In view of your commitment to the SI and VSI programs you began, why did you decide to do that?

**Deanna:** Well, 25 years in one job is probably enough for anybody! Also, I need more freedom than the directorship of the center permits. I want to take SI and VSI into new directions, and I didn't feel that I could do that while managing a center as comprehensive as ours. Our Vice Chancellor, Larry Dietz, is permitting me to work directly for and with him. I feel very fortunate to get to do what I want to. This also gives me the opportunity to do the research and writing that I've neglected. My first project is to complete an international monograph on SI with samples of the brilliant work done in other countries. I'd also like to finish a full-length book with some of my colleagues on our work in developmental education.

**Interviewer:** Tell me more about these new directions.

**Deanna:** First, the venue. I believe SI—and even more so VSI—has the potential to change the nature of community education. It can operate outside the established educational systems, many of which have lost all credibility, both with the populations they serve and the populations

that support them. I have long wanted to bring VSI into the public schools of our inner cities in a way that is supportive of both teachers and students. It seems to me ironic that we had to first take VSI into South Africa and show that it works there in order to earn the necessary credibility to try it at home. I believe that it can contribute to education in our own troubled cities as substantially as it is contributing to education in the new South Africa.

Secondly, the emphasis. I want to explore the new frontiers of consciousness—the issues I spoke of earlier. I'm interested in it from both a scientific and a metaphysical point of view. In order to do that, I need to immerse myself in these disciplines. Actually, I think that the exploration of consciousness may well be the new arena for developmental educators.

**Interviewer:** Well, we will look forward to hearing more from you on that subject. It sounds as though your next 25 years will be as exciting as your first.



# Faces in the Crowd: Stories of Developmental Education Students

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## Abstract

*Although the names have been changed, the following stories are true accounts of students in developmental reading and writing classes. These short vignettes illustrate the diversity among developmental students. Trong feels that, as a computer science major, he does not need to be able to read and write well. Taneesha is a determined young woman who aggressively pursues her own learning. Maria is hesitant to speak in class but, amazingly, opens up when alone with her teacher, and Heather teaches her instructor a valuable lesson.*

**L**ike many educators, the most important factor that makes me love my profession is the opportunity to work with students. After more than 28 years of teaching, the last 15 spent in developmental education programs, I am still entranced with these remarkable people. My students' diverse backgrounds and educational needs both delight and challenge me. Each one brings a new perspective and leaves the gift of his or her uniqueness to enhance my life. With gratitude and profound respect for my students, I have attempted to share some of their stories.

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## Trong

Trong drags himself into the classroom. Slowly, deliberately, his leg thrusts forward. It is a long step, no doubt meant to make up for some of the time he loses for walking so slowly. Following the long step, Trong pulls his other leg to meet the first. His foot, turned somewhat sideways, drags the floor. As he sits, I notice the outline of what should be his knee underneath the cloth of his pants. The outline is square, as though there is a box where his joint should be. At first I think it is a brace, but after a time, I realize that the lower part of his leg must be a prosthesis. But I can hardly call it that. Prostheses are sophisticated. With a prosthesis, Trong would be able to walk almost normally. No. Trong must have a wooden leg.

Trong does not like my class. His spoken English is halting, and his writing indicates that not only is English grammar a mystery, but so is sentence structure and the Western linear thought process he must learn before he advances to a college-level English course. Trong is painfully shy, so talking in this strange tongue is a humiliating experience in slow motion, and writing is even worse. And so he retreats. Trong rationalizes that because he wants to be a computer scientist, he must concentrate more on his math and science courses and, therefore, does not have enough time to keep up with his reading and writing assignments. When I confront him with his late assignments, he tells me I assign “too much” reading for him to finish.

What must Trong think when I bounce around the room in my exuberant manner, cracking jokes he only partially understands? His diffident smiles and occasional stiff attempts at conversation with me indicate that his obvious dislike for the class does not extend to the teacher. But surely I overwhelm him with my enthusiasm because he seems to have none. Perhaps he lost it with his leg.

The semester is two-thirds over before I learn I am pronouncing Trong’s name incorrectly. I have been saying “Trawng” or sometimes “Trawn.” But the fellow who sits next to Trong tells me that his middle name is also Trong, and it is pronounced in a fast, percussive manner, with the “ng” sounding as if it were caught in the back of the throat. Trong gives no explanation when I ask him why he did not correct me, for surely it bothered him to hear me mispronounce his name. Undaunted by Trong’s apparent apathy, I insist on learning the correct sounds and intonation that make up his name. Trong’s classmate is an enthusiastic, patient teacher, but Trong does not help with the lesson and gives me no sign he is pleased when I finally learn.

Trong’s face is a mask, a square mask on a square, plodding body. Throughout the semester I wonder what is behind the mask, but I am afraid to ask, afraid of the answer. His wide lips are frozen in a wooden expression that is neither smile nor frown. His wide-set eyes show no joy, no sadness, no understanding, no confusion, no interest.

One day I tell Trong he must see me after class for a conference. Wishing to spare him—and me—the strain of my pause at each step while he drags his foot, I tell him I need to run a quick errand, and I will meet him at my office. When I arrive Trong is already waiting for me. This pleases me because he gets the satisfaction of hearing me apologize for being late.

In the office Trong tells me that for the next semester he is planning to enroll only in math and science classes because he wants to concentrate on his major. I make an impassioned plea for Trong to concentrate on learning to express himself in English. Surprisingly, he says he agrees with me and even vows to drop some of his science courses in favor of English classes. For the first time, he sounds almost personable and enthusiastic. But, like many students, he is only telling me what he thinks I want to hear. I know this semantic dance. But still I go through the motions of pretending to believe him, if for no other reason than to keep him talking. Though his pledge is hollow, for once Trong's words soar. Trong is gracefully waltzing his promises around my office with no interference from his wooden leg. He smiles in appreciation of his skills.

## Taneesha

Mizzz Taneesha Taylor, The Most Modern and Highly Esteemed African-American Queen, is holding court before class begins. The long chalkboard in front of the room is covered with her declarations for the day. First comes her name, written boldly, covering about a third of the board and followed by her selected trademark, "Double T." High on the center portion of the board, she has written her message. It states, "Good afternoon, class. I am your substitute teacher for today. No homework!"

Mizzz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen and Substitute Teacher, is standing in front of the class with hand on hip. With an impish grin, she is unsuccessfully, but valiantly trying to get the class to listen to her. When I walk through the door, she starts to giggle uncontrollably as she coyly looks up at me through lowered face. "Oh hi, Miz Smith," she gushes. "I'm just trying to start class for you. I'm your new teaching assistant!"

Mizzz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen, Substitute Teacher and Teaching Assistant is serendipity's gift to me. I cannot look at her, or even think about her, without smiling. I imagine a saner teacher might be annoyed with her overflowing exuberance, but I revel in her laughter, her flashing grin, her zest for absolutely everything. I learn to enter the classroom by saying, "Teacher's Assistant, please erase the board." And, even though this is college, I indulge her by allowing her to spring out of her chair and collect the completed homework.

Mizzz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen, Substitute Teacher, Teaching Assistant and Exuberant One is worth every bit of extra patience she demands. Aggressive in her quest for knowledge, she bombards me with questions, inundates me with opinions, and savors every word I utter. "Now let me get this straight. How do you want us to do that?" is what I learn to expect, or "Oooo, that assignment sounds hard, but it's a good one!" She does not realize it, but she truly is my teaching assistant.

Mizzz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen, Substitute Teacher, Teaching Assistant, Exuberant One and Determined Student does not let illness slow her down. Bronchitis coupled with asthma dulls her eyes, but she pushes on. On the

days she misses class, I know I will get a phone call. "Hello, Miz Lonna Smith. This is Mizz Taneesha Taylor from your class, you know, Double T? Well, I'm calling 'cause I was too sick to go to class today and my grandma called me to tell me what kind of medicine to get so I won't cough, and I'm going to go out and get me some of that medicine, but first I wanted to call you to ask you what did I miss in class today, because after I get my medicine, I'm going to take a nap and try to sleep and then I'm going to do my work for your class and I want to know what I missed because you know me, I will keep up with my work no matter how sick I am, and I promise you I will be in class next time no matter what."

Mizz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen, Substitute Teacher, Teaching Assistant, Exuberant One, Determined Student and Vociferous Being is supremely confident in her abilities. She orally prefaces each essay she writes with an enthusiastic endorsement of her own work. "Miz Smith," she assures me, "You're gonna love my paper; you're just gonna love it! Really, really, honestly, you're in for the thrill of your life. You will want to read my paper first. Now, don't forget. Read mine first!"

Mizz Taneesha Taylor, the Most Modern and Highly Esteemed African-American Queen, Substitute Teacher, Teaching Assistant, Exuberant One, Determined Student, Vociferous Being and World Class Writer sails through the course. When I report her success to her, she is not the least bit surprised. Neither am I.

## Maria

As we share the elevator, I chuckle inwardly as I observe Manuel and Maria. Boyfriend and girlfriend for about three years, this couple looks as if they have been married for thirty. They have settled into a quiet, comfortable, lived-in look, as they stand close but without touching. Both are short and stocky with shy smiles and dark, laughing eyes. With the alliteration of their names, they could be mistaken for twins but for the gentle smiles and occasional affectionate touches that pass between them.

I use our brief elevator ride to engage in some conversation. "Maria, that's a pretty cardigan you're wearing."

Maria gives Manuel a quick look and leans toward him as he quietly supplies the Spanish word for cardigan. Looking down, she mumbles, "Thank you."

Once again I have failed to lure Maria into the ocean of the English language that seems to be beyond her reach. Although he has not been in this country for as long as Maria, Manuel has far surpassed her in his ability to read, write, and speak English. He has become a proficient swimmer, but Maria is still standing motionless on the shore. Occasionally she dips her toes in the surf but resists going further.

In small discussion groups, Maria is silent, speaking only when required. My pleas to Manuel that he spend at least part of their time together in English conversation go unheeded. "Maria gets angry when I speak English to her," he tells me.

A few weeks later, we go on a field trip to Salinas, about an hour away from campus. Manuel lives there, and he will meet us at our first stop. The other students have formed carpools, but Maria has accepted my offer for a ride. This will be my grand opportunity! I pick her up on campus, armed with questions for her to answer—in English.

As we drive off, I begin. “So, Maria, what do you want to do after you graduate?”

“What I want to do is to become a counselor,” she answers. “Do you want to know why I want to be a counselor? I want to tell you. It’s an interesting story. This story begins when I was in high school. I came up from Mexico when I was in the eighth grade. For one year I was only in ESL classes. Then I learned enough English to go to the regular classes. At that time I was ready to start going to the high school, so I didn’t know what classes I should take. You see, how could I know? I was just starting high school, and I was just starting regular classes. I had to do what my counselor told me to do. I just took the classes she gave me, but what I didn’t know was that she gave me only very easy classes.”

“How did you feel about that?” I interject.

“No, wait. I’m not done. I’ll explain that. I was scheduled into very easy classes, and after a few weeks, I realized that the classes were too easy for me, and I went to the counselor and told her . . .”

Maria continues to talk, and talk, and talk as she relates what turns out to be a very interesting tale of educational failings and triumph that includes mother-daughter trust issues, visits to the school district’s superintendent, and her eventual entrance into college. Whenever I attempt to join in, I am quickly silenced with a wave of Maria’s hand and a “No, wait. I’m not done.”

It becomes delightfully clear Maria has no use for me, except as a listener. This hesitant “non-swimmer” has filled my car with language and is paddling around just fine, thank you. Even rough water does not bother her.

“ . . . and my mother told me that, if I kept this up, I would ruin my . . . ah . . . I can’t think of the English word. Ah . . . I would ruin my . . . ah . . . you know . . . the way everyone would think about me . . . ah . . . my . . . rep-u . . . reputation. That’s the word! But I told my mother I was a good girl and no matter what anyone would say about me, it wouldn’t bother me since . . .”

Maria’s story continues all the way down to Salinas. When we arrive at our destination, she announces, “I still have more to tell you, but I’ll stop now and tell the rest on the way home.”

And she does! The story continues until its conclusion two-thirds of the way back to campus for a total of about an hour and forty minutes of Maria speaking English.

I am amazed and elated. If Maria can regale me—in English—for almost two hours, surely she will continue her newly discovered talents in class. But the next week she is once again silent, leaning toward Manuel for the occasional translated word. And when I again implore him to spend time conversing with Maria in English, he shrugs his shoulders helplessly and repeats, “Maria gets angry when I speak English to her.”

## Heather

I trudge my way through two classes' worth of students' essays. Some have made valiant tries at analyzing aspects of the novel they have just read and discussed; others have churned out two typewritten pages of dimly related thoughts. I read, I correct, I mark errors for students to correct. I ask questions and make comments in the margins, give a comment at the end, assign a grade, move to the next paper and repeat the process. With a new essay in my hand, I begin. Again.

It takes only a moment to realize that this new essay is unlike the others. My eyes stop at a phrase proclaiming that an event is an example of "one of the most powerful motifs expressed in the novel." Reading further, I see the essay ends in an insightful analysis of a metaphor never discussed in class.

This paper is good. It is very good. It is outstanding. It cannot be original. Eighteen-year-old college students enrolled in developmental writing classes surely do not write—or analyze—this well.

Glancing at the name of the "author," my heart sinks. It is sweet, wonderful Heather. This is impossible! In every dealing I have had with her over the semester, I have seen Heather as a trustworthy individual. Am I such a bad judge of character that I cannot tell a person of integrity from a plagiarist? And how could Heather deceive me this way? I have always been kind to her and have always treated her with respect. Did she actually think she could get away with this? With funereal solemnity, I write "see me" on the paper and set it aside.

At the beginning of the next class meeting, as I return the essays to their owners, I observe Heather. She looks for my comments and sees my directive. A cloud of worry and confusion obscures her face as her skin pales and her eyes look down. I think, "For someone who should be feeling guilty, she looks awfully confused. Is she disappointed that her plan didn't work?"

As I go over some common grammatical errors and rhetorical problems with the class, I find myself avoiding Heather's eyes, but from the corners of mine, I watch her. As time passes, she looks worse, and I can almost see a green tinge to her skin. It is obvious this young woman has learned her lesson, and I can imagine her throwing herself at my mercy after class. In fact, she is looking so awful that I dismiss the class ten minutes early in order to end the torture she is experiencing.

Heather stays behind and approaches me with sad eyes, her skin almost matching the chartreuse nail polish on her nails. She hands her essay to me.

"Heather," I begin, "This paper is really well-written."

A flicker of hope crosses her face.

"But I have a few questions."

The hope vanishes.

I point to the paragraph containing the reference to motifs and say, "Here, where you write about a powerful motif, I'm a bit confused. Can you explain what you mean?"

"Oh," Heather moans, her hands flying up to her face, "I knew I shouldn't have used that word! We talked about motifs in our discussion group so I thought it would be okay, but I probably shouldn't have used it."

"It's okay to use that word. Heather, there's nothing wrong with the word 'motif.' Just tell me what it means."

"It's a, a, a, well, it's like something that happens over and over again, like a theme that repeats itself. I learned the word in my art class, but I knew I shouldn't have used it here. I'm really, really sorry."

As I listen, I realize that this eighteen-year-old college student enrolled in my developmental writing class certainly does know the meaning of the word "motif." I am beginning to feel like a fool, and I am loving every minute of it!

I continue. "At the end of your essay, you wrote about the metaphor of weaving while connecting the beginning of the book with the ending."

"Oh gee, I'm sorry about that," Heather interrupts. "We never even discussed that in my group or in class, but you see, I really, really loved the book, and I couldn't wait to write about it. So I worked really, really hard on my essay and kept going back to it and reading it and revising it, but I just couldn't write a conclusion that I liked until, during one reading, I suddenly understood all about the weaving metaphor and how it connected to the main character. So I started writing about that, and then it just seemed that what I wrote would make a good conclusion, so I left it in. I guess I shouldn't have done that."

Laughing, I answer, "Heather, you did just the right thing when you used that part for your conclusion. This is a beautifully written paper."

I lean down and plant a giant A+ in the margin. Then, I look over to give Heather, who is now literally crying with joy, a hug. As we hug, I whisper in her ear, "Oh Heather, forgive me. This paper is so good, I was afraid you had copied it."

"What?" she gasps, and I'm certain she is furious with me. But instead, her face brightens into a wide smile. "Well, I guess that's a compliment. If you thought it was so good that a professional wrote it, it must really be good. Thank you. Thank you!"

Quickly, I grab Heather for another hug so she does not see the tears that have sprung up in my eyes. I silently give a prayer of thanks for the lesson she has taught me.

## Conclusion

Of what value are these stories to the developmental educator? Each holds many lessons for the teacher, but poses numerous questions as well. As we revisit each student, both lessons and questions surface.

I will always wonder about Trong's history and how it shaped him. He was a closed book to me. Was there anything I could have done to "win" him over and cause him to truly understand the importance of developing his English language skills? Perhaps I should have held frequent conferences with him throughout the semester where I could have learned how to help him and where he might have come to accept my advice. But throughout the term, Trong resisted my suggestions that we meet, and it was only at my insistence that he finally came to my office. Perhaps, if Trong had been assigned a mentor who would have met with him on a regular basis to monitor his academic and personal adjustment to college, he might have had more success.

A mentor could have also helped Maria become more independent. It is clear to me that she and Manuel should not have been classmates. Without Manuel nearby, Maria exuded verbosity. With him she was passive and, seemingly, unable to cope with the demands of college. I wonder why.

Taneesha was another matter. Her energy and determination enabled her to succeed, but her exuberance called for patience. However, I came to appreciate her boundless enthusiasm early in the term and learned that, by accepting her somewhat immature and certainly unorthodox behavior, both Taneesha and I would thrive. We were good for each other.

Perhaps Heather taught the most valuable lesson. None of us must ever doubt the potential of any student. Of course, I am not so naïve as to believe that plagiarism does not exist, but to assume that a student could not be capable of critical thought and clear writing simply because he or she is labeled as developmental is not only foolish but is also detrimental to both student and teacher.

Together, these vignettes illustrate the diverse nature of developmental education students. Coming from an infinite variety of backgrounds and experiences, and having an equally infinite variety of strengths as well as needs, these students must be regarded as individuals. I have learned that attempting to categorize and generalize is a worthless exercise. It is far more productive to respect their individuality and appreciate their diversity.

# Mind Dance

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## Abstract

*This chapter describes an assignment in which developmental students view and respond in writing to a portion of the video, “River Dance New York.” The film clip presents a story of multicultural interactions portrayed in dance. This assignment requires students to think critically and draw concrete supporting details to further develop their writing.*

Two years ago, I viewed a Public Broadcasting System (PBS, 1998) presentation of “River Dance New York,” featuring the River Dancers from Ireland. One of the featured dances immediately interested me because it involves African American tap dancers as well as a group of the Irish dancers, and highlights multicultural issues. The dancers exhibit behaviors and emotions common to cultural groups interacting for the first time. This segment of the performance became the foundation for a writing assignment for my developmental English students at Fort Valley State University, a historically Black institution. It has become one of my favorite assignments for the following reasons:

1. Students have a “cultural” experience—they watch dance and enjoy it!
2. Students have an opportunity to examine multicultural issues in a light-hearted manner.
3. Students see successful Black artists.

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4. Students must draw concrete details from the video to develop their thesis, topic sentences, and supporting evidence for their point of view about the dance's meaning.

5. Students are involved in critical thinking activities. Talking and writing about the dance is akin to talking and writing about short story, complete with symbolism, themes, and characterization.

6. Students who prefer to learn through visual and interactive means (Higbee, Ginter, & Taylor, 1991) have an opportunity to apply these skills in a writing course.

Briefly, the dance tells the story of two cultures. It begins with a narrative voice saying, "My mother taught me tall and straight is how you dance." Two Black males tap dance down steps to the sounds of a saxophone, played by a White male, stage right. The dancers wear loosely fitted clothing appropriate to the loose, athletic, casual, and flowing dance they perform. Three male Irish dancers appear on stage left with a female fiddle player, who interrupts and overrides the saxophone player. The two musicians play the same tune, but they sound so different that only the discerning listener would realize it. (It was one of my students who pointed out to me that the songs were, in fact, the same.) The Irish dancers are wearing black fitted pants and white shirts, a more formal style of dress to match their formal, stiffer dance style. The Irish dancers hold their bodies very straight and still; the action is all in the legs, a tap-like dance, with ballet-type leaps, all performed very quickly. Surprised, the New Yorkers gape.

What ensues is a sort of "dance off" in which, in a very playful manner, the dancers laugh and make fun of one another. They show off for each other, each performing their own special kind of dance. The lead Irish dancer does his sleight of foot dance, challenging the Black dancers. The lead Black dancer responds with a fast twirl, down the length of the stage and back, on his toes; then he climbs a wall, doing a back flip. His friend encourages him to dance up the wall again, which he does, ending with a leap over his friend's head, landing in a split. The two musicians engage in their own version of "dueling banjos" with the fiddle and saxophone.

The Black dancers mimic the Irish dancers, making good-spirited fun; the Irish dancers return the favor. Then each group makes a serious attempt to try to perform the other's dance. They wind up dancing all together in a line, White—Black—White—Black—White. As the dance ends, the dancers clasp hands and raise their arms together in triumph. Meanwhile, the two musicians are playing their instruments, standing together. The dance story offers to the audience a brief symbolic look at cultures in conflict, whose representatives come to recognize the value of the other culture. They learn to appreciate what each does best and how they can, indeed, join together to make music and dance.

Students look at many aspects of this video clip and try to put the experience all together into a meaningful piece of writing. In preparation for the assignment, I give the students the following directions:

You will be viewing a short film of a dance. The first pair of dancers are New Yorkers; the other three are Irish. As you view the short clip, notice what goes on. After viewing this dance twice, you will have to write about what you saw. As the dancers interact, a story

unfolds. There are in this dance many of the elements of a short story: (a) plot, (b) characters, (c) action, (d) conflict, and (e) resolution.

First, just watch. Then we'll talk about the video. The second time you watch, take notes that will help you describe the dance, the characters, their actions, the conflict that develops, and the resolution. Try to interpret all these elements. Describe what you see and explain it. Or tell the story and interpret it. Finally, be sure to include in your writing some statements about how it felt to watch this dance.

Following are the guiding questions that I distribute to students to read before viewing the video:

1. What do we see first in this dance? Be sure to note where the first dancers are.
2. Describe their clothing and their style of dance.
3. Comment on the music.
4. The first "complication" is the appearance of the next set of dancers. Describe these dancers. Describe their clothing and style of dance. Where are these dancers in relation to the other two?
5. Pay attention to facial expressions and gestures.
6. Notice the music of the second set of dancers.
7. How do the two sets of dancers react to each other? Specifically describe some of their reactions.
8. Notice the clear leader of each set of dancers.
9. Explain what is going on when the two groups dance for each other.
10. Notice that each leader performs his best movements. Why?
11. Describe what happens between the musicians.
12. Describe what happens at the end of the dance. Notice where the dancers are, where the musicians are, and the gestures. What has happened?
13. Interpret the story.

In responding to this assignment, some students go into great detail describing the dance, demonstrating that they understand the importance of including descriptive details in their writing. Some spend a little time interpreting. Hardly any students spend considerable time interpreting, which is a complex task that they are possibly just beginning to develop. Of course, the responses to the assignment are as varied in quality as the students vary in ability. Some write very short assignments, so brief as not to meet the requirements of the assignment. However, the majority make a serious effort and comprehend the message of the dance—that differences can be resolved and that people from different cultures can work together to produce beauty. The following quotes from student papers demonstrate that the students understand and enjoy the dance and that many of my goals for this assignment are met:

The river dance signifies challenge and partnership. The video shows two groups that oppose each other in order to contrast their culture. At the end, the two groups show partnership when they join together to create and dance one pattern. The groups joining provides a conclusion to what the river dance really means.

At the end of the performance, everyone comes together. I learned that even though the two dance groups were different and had different cultures, they still could relate to each other as friends.

At the end, when the dancers interact, it shows unity and how we are more alike than we are different. Unity is displayed through their dancing together. I have learned that just because we are different doesn't mean we cannot enjoy the same thing.

They showed that even though they had different styles, they could still be friends and dance together. The show drew my attention. I would enjoy watching a river dance performance live.

I learned that river dancing isn't so boring after all and it's very hard to do, so it seems.

I was very proud to see the American group represented by Blacks that show that Blacks can do anything just like other cultures.

I responded to the joyful story of this dance. I saw how the two cultures had so much in common. There was something about their dance that transcends all national and cultural boundaries.

This is an excellent assignment for all the reasons previously stated. It involves students in an experience that is both cultural and multicultural. Students must observe, take notes, and then synthesize and interpret the material in order to write about it. They see, in a very light-hearted kind of lesson, not only how differences can lead to strength and beauty, but also that, to paraphrase Maya Angelou, we can be more alike than we are different.

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# Teaching American History in a Developmental Education Context

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## Abstract

*The General College (GC) at the University of Minnesota incorporates developmental education goals and strategies into the design of a wide variety of typical freshman-level courses. The success of this program refutes assumptions that the integration of academic skills development into rigorous content courses would result in the lowering of expectations, the dilution of course content, and the loss of class time. This chapter conveys the GC model of developmental education by examining in detail the educational goals, teaching methods, classroom activities, and assignments in a freshman course in U.S. History. Ultimately, utilizing the best teaching practices while integrating academic skills development in a rigorous content course creates the foundation for enhancing the educational experience of all students.*

**M**any educators have no concept of developmental education while others view developmental education as consisting of separate courses that focus on reading, writing, and mathematics skills. Often these are noncredit courses that address knowledge and skill deficiencies that critics assume should have been acquired prior to high school graduation. Unfortunately, student motivation in these courses is frequently low because of their noncredit status and what may be considered a remedial stigma, and also because the

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assigned reading and writing exercises are isolated from credit-bearing classes and the mastery of any particular content area. Research has revealed the limitations of this model by strongly indicating that students acquire and incorporate learning and study skills best when they can be immediately applied in the context of content courses (Davis & Cleary, 1994; Kluepfel, Parelus, & Roberts, 1994; Levin & Levin, 1991; Stahl, Simpson, & Hayes, 1992).

For several decades, policy makers and legislators have debated the role of developmental education at the college level, with critics portraying these programs as both wasteful and ineffective (Boylan, 1999; Mickler & Chapel, 1989). Hunter Boylan (1999) recently refuted some of these criticisms and clarified others while exploring a variety of developmental education alternatives. These current practices included freshman seminars, Supplemental Instruction, learning communities, paired courses, critical thinking instruction, and strategic learning. Boylan indicated that each of these programs has achieved some measure of success with developmental students and has not been the target of major attacks.

The General College (GC) at the University of Minnesota provides another alternative by incorporating developmental education goals and strategies into the design of a wide variety of typical freshman-level content courses. Instructors organize their courses and create assignments designed to integrate the development of reading, writing, and study skills into the process of acquiring content knowledge. Deficiencies in math are addressed with noncredit courses, but other aspects of academic skill development are incorporated into the various credit-bearing freshman-level content courses.

Integrating skills development into content courses is a pragmatic answer to the fact that nearly all freshman college classes have developmental students. Thirty percent of all entering U.S. college students required some sort of remediation in their first term, a situation that has changed little since the early 1980s (Boylan, 1995; Lederman, Ribaldo, & Ryzewic, 1985; Plisko & Stern, 1985). These numbers are understated because they do not count other students who took remedial courses after their first registration or students in a variety of nonremedial developmental education programs. Although the academic abilities of students will vary depending upon the entrance requirements of the particular college or university, nearly every freshman class will have students who are less well prepared and have weaker academic skills than what is expected for that class. The academic success of those students is "at risk."

Many in academia would like to ignore these realities while blaming the secondary school systems or would prefer to ignore the latest research by continuing to rely on standard remedial classes to "fix" the problem. Some college professors view their role as gatekeepers, "weeding out" students unable to perform, rather than as teachers dedicated to improving student abilities. Others assume that addressing the needs of developmental students would result in the lowering of expectations, the dilution of course content, and the loss of class time. These effects would be detrimental to all students and, ultimately, counter-productive to achieving the academic success of developmental students. The growing success of developmental education at the General College refutes these negative assumptions. Ultimately, utilizing the best teaching

practices and innovative methods in a rigorous content course, while integrating academic skills development, creates the foundation for enhancing the educational experience of all students.

## General College: The Context

The General College is a self-contained developmental education program within the University of Minnesota offering a wide variety of lower division courses in the sciences, social sciences, and humanities, as well as math and composition. Faculty members design these courses conforming to traditional disciplinary expectations about content and rigor, but with additional insight from developmental education theory and practice. The curriculum prepares students for transfer into degree-granting colleges at the university by enhancing their knowledge and improving their academic abilities so they can be successful in upper division coursework. Academic advisors and professional staff provide a strong support system for students and faculty.

The mission of the General College shifted from general education to developmental education in 1987, and the implementation of developmental education theory and practices has resulted in steady improvement in retention and transfer rates during the subsequent decade. The second year retention rate for the 1997 freshman cohort was 77.3%, up from 61% in 1990. In that same 1997 freshman cohort, 34% transferred to a degree-granting college at the University of Minnesota by the end of the first year, a seven-fold increase from 1987. Dramatic improvement has also occurred in transfer rates over longer periods. The 1995 freshman cohort had a transfer rate of 48% after two years and 54% after three years, tripling the two-year rate and more than doubling the three-year rate for the 1987 freshman cohort (General College, 1999; delMas, 1999; Wambach & delMas, 1998).

The subsequent success of students transferring from GC is an important indication of the quality and rigor of GC courses. The General College admits students who are below the cutoff (based on high school percentile and American College Testing scores) for acceptance into the College of Liberal Arts (CLA), and most GC students ultimately transfer into CLA. GC transfers have consistently performed well since 1989, with those in good academic standing having never fallen below 90%. The graduation rate for GC students exceeds that of all other transfer students and is impressive when compared to the initial CLA admits, some with 4.0 high school averages, who had been deemed better prepared for college success. The graduation rate for GC students five years after transfer to CLA equals or exceeds the five-year graduation rate for students initially admitted to CLA (General College, 1999; Wambach & delMas, 1998).

The most effective way to convey the GC model of developmental education is to examine in detail how academic skill development is integrated into a common freshman content course such as U. S. History. General College offers a four-credit, one-semester course titled United States: Growth in National Power (GC 1231), which provides a general overview of American history. Most colleges and universities divide American history into two semester courses, yet this GC course incorporates skill development even with severely limited class time. This example, along with the statistics concerning retention, transfer, and graduation, should

illustrate the fallacy of assumptions about inadequate class time and the dilution of academic rigor.

## **United States History: Integrating Developmental Education**

GC 1231 enrolls 35 to 40 students per section, but the ideas and methods used could be adopted in a typical large lecture class with weekly discussion or recitation sections. It is designed to convey as much knowledge and demand as much rigor as any one-semester, freshman-level U.S. history survey course. In addition, the mission of the General College requires that all courses be designed to significantly improve the academic skills and habits of at-risk students so that they ultimately can be successful in other university courses. Consequently, the course has the following four developmental education goals, which are discussed in greater detail below: (a) to develop student academic skills in writing and creative thinking; (b) to assist students in developing good academic habits; (c) to use innovative teaching methods and relate class topics to current issues; and (d) to increase the frequency and vary the method of assessment and feedback.

### **Academic Skills**

GC 1231 has been designated as a writing intensive-course by the University of Minnesota. These courses are designed to develop the student's writing ability, particularly in research papers, beyond the level provided by the required composition courses. Students must successfully pass two writing-intensive courses in order to graduate. In GC 1231 students need to complete three different types of writing assignments: 11 short homework questions, a long essay question on each of four major exams, and a six to eight page formal paper. These writing assignments constitute 58% of the overall course grade: total homework 8%, total of four essays 33%, and formal paper 17%. Because the course is writing intensive, a graduate teaching assistant (TA) is available to critique and grade the homework assignments and provide a detailed critique of the first draft of the formal paper. The instructor grades all the essays and the final draft of the paper.

Students are expected to answer homework questions in one paragraph of six or seven sentences, and the questions are constructed so that the answer cannot simply be copied from the text. The questions are of two basic types. The first type requires students to identify key points or summarize events from a two to three page section of the text. The second type of question asks students to assume a particular role (given the background information from the assigned reading) and reflect on what their actions or decisions would be in that situation. The 11 homework exercises gradually enhance the students' organization and analysis skills, as well as their critical thinking and creativity.

Students are expected to answer essay questions in a lengthy essay encompassing four to eight pages in a test booklet (i.e., "blue book"). Essay questions focus on broad themes that require students to consolidate and compare information and ideas over the span of a historical period. Essay questions are announced one week in advance of the exam so students can

organize their thoughts and look for evidence to support their arguments. This practice not only develops the students' writing skills, but it also enables the instructor to have much higher expectations about the preparation for the essay and the quality of the arguments. Poor performance can be dealt with appropriately because the "problem," either the student's lack of ability or lack of motivation to study, can be more easily determined. Essays are written in class without notes and the bluebooks are marked to prevent students from bringing a previously written essay into class.

### **Good Academic Habits**

Attendance is taken at every class, and a class participation grade (8% of course grade) rewards students for their interest and involvement in the course. Class participation includes attendance, active participation in class discussion, pre or post class discussions, utilization of instructor and TA office hours, and energy in acquiring material or making up work missed due to absences. Homework assignments are scheduled and keyed to specific chapters in the textbook to promote the student's completion of the reading assignments prior to the class discussion on issues covered by that particular chapter. This practice not only diminishes student tendencies to procrastinate, but students are better prepared to contribute to the class discussion, which is focused on the homework question due that day. Hopefully, students who have been reluctant to respond to questions from the teacher or to ask their own questions in class may now have the confidence to participate.

The student receives a review sheet one week before each exam with six to eight study questions for each chapter and the essay (or choice of essays) on the test. These review sheets assist students in effectively organizing their study time, promote the use of instructor office hours, and result in a more obvious connection between increased preparation and higher grades on exams. The review sheets also avoid a common student frustration of not knowing what to study, as well as directly debunking the belief of some students that studying will not really benefit their grade. It also tends to increase student use of the textbook in preparing for the test.

The academic transition from high school to college is difficult for many freshmen. The faster pace, increased volume of reading material, and higher expectations at the college level usually require students, particularly those who struggled in high school, to significantly increase their level of effort accordingly. Some students fail to realize this necessity or the higher expectations associated with essay questions announced in advance. A low score on the first test often serves as a "wake-up call" for them. In many instances, however, failing the first test would put these at-risk students in such academic difficulty that they could not recover by the end of the term. To counteract this, conferences are scheduled with students who fail the first test to discuss what they did wrong and how they might improve on subsequent tests. They also are informed that if they get a C or better on the next two tests, they will be allowed to write another essay on a new question to replace the essay score on the first test. The message is clear. If they adjust their effort and improve their performance, they can still achieve academic success in the course.

### **Innovative Teaching Methods**

The course provides a variety of active learning situations, particularly through the use of simulations, homework questions, and small group analysis of historical documents. The classroom simulations and some of the homework questions are designed to put the student in the role of some historical person. In this way the student confronts the historic situation, weighs the various arguments, and reaches comparable conclusions to those in the real experience. The historical documents have been selected and edited to highlight specific points for class discussion. Working in groups, students can share ideas and improve their own understanding by explaining issues to one another. Some students, who have not excelled in the usual multiple choice and essay tests, display skills and abilities in these situations that deserve evaluation and recognition.

The simulations, ranging in length from 20 to 60 minutes, provide a variety of additional benefits in a developmental education context. They are fun and provide a break from the normal routine. Students are motivated by the game format of simulations, which creates both competitive and cooperative situations with goals and rewards for each player or group of players to “win” the game. Students can be asked to discuss the real life goals and rewards that motivated the historical decision makers being simulated to “win” in their own lives. The issues examined and argued in the simulations are key points for the essay questions on the exams, so students utilize their simulation experience along with their factual knowledge and understanding of concepts.

These teaching methods incorporating active learning situations and small group activities provide additional benefits. The small group analyses of historical documents and the negotiations involved in the historical simulations promote acquaintances and friendships that help the students adjust socially to college life. The announcement of essay questions and distribution of review sheets prior to the tests promote the formation of study groups outside of class. The instructor urges student discussion of essay and homework questions outside of class as well as the cooperative use of the review sheets in preparing for the exams.

Whenever possible, the instructor identifies the historical background of current issues and points out parallel developments with the present. Each time the course is taught revisions are made in the topics discussed, the handouts are used, and the homework questions are assigned to make the course as relevant as possible to current issues. Even the presentation of the same topic varies from year to year based upon current issues and the recent experience of the students. The availability of three very different options for the formal paper (historical biography, national demographics, and local census analysis) facilitates students finding topics of relevance and interest to them.

### **Assessment and Feedback**

The frequency of assessment and feedback is illustrated by four exams, eleven homework assignments, a mid-quarter academic report, and academic alerts as needed. Following the first two exams, the instructor utilizes class time to examine the results, respond to student questions,

and discuss in detail various ways of answering the essay question. The homework assignments and the required first draft of the formal paper are critiqued in detail, with substantial written comments, by a graduate teaching assistant. The final paper is due several weeks before the end of the term and is graded and returned in a timely fashion. This enables the instructor to make general comments to the class and have more detailed discussions with individual students before the semester is completed.

A variety of different assessments are used for the course. Knowledge and comprehension concerning the review sheet questions are assessed in the multiple choice sections on the four tests, constituting 33% of the course grade. Class participation is evaluated and rewarded, and the small group dynamics in the simulations and document analyses can result in the display of student knowledge, skills, or abilities that are not readily apparent in objective or essay tests. The short writing assignments for homework reward diligent students and assess their abilities to summarize detailed events. The four long essays require students to trace an important theme through a time period. Finally, the formal paper assignment has three options, each requiring a different set of historical skills and abilities.

## Conclusions

The General College's philosophy of integrating academic skills development into content courses conforms with the latest research on developmental education and provides an effective alternative to remediation. Although it requires planning and a comprehensive approach to developmental education, this model does not require lowering expectations, diluting content, or increasing class time. Given that nearly all freshman courses contain some developmental students, the needs of those students should be addressed. The developmental goals used in the design of GC 1231 can be summarized as follows: develop academic skills, promote good academic habits, utilize innovative teaching methods, and increase assessment and feedback. The integration of academic skills development and good teaching practices in a rigorous content course should benefit all the students, not just the developmental ones.

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# Teaching a Human Anatomy and Physiology Course within the Context of Developmental Education

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## Abstract

*The goal of most anatomy and physiology courses is to do justice to the body of knowledge presented in their textbooks. However, when it is taught within a developmental education setting, an anatomy and physiology course must be modified to accommodate students' academic needs. We use the concept of anatomy and physiology as a medium to foster the students' overall academic skills. This chapter will describe specific curriculum and instruction activities in our course, Biological Sciences: The Human Body, and demonstrate how anatomy and physiology can be taught within the context of developmental education.*

**B**iological Sciences: The Human Body is taught within General College (GC), a non-degree granting college of the University of Minnesota (U of M). The college's mission is to provide developmental education to its students, that is, to facilitate the improvement of students' basic academic skills, such as writing and test taking, to a level that will lead to transfer and success within other colleges at the university. Students applying to General College are

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evaluated according to their accumulated academic record (AAR). Under this system the student's ACT composite score is doubled and added to percentile class rank. For example, a student who scored a composite ACT score of 17 and had a percentile class rank of 60% would be assigned an AAR score of 94 that is,  $[(17 \times 2) + 60 = 94]$ . The General College admits students with AAR scores between 70 and 90. Other colleges at the University have minimum AAR requirements as well (e.g., admission to the College of Liberal Arts requires a minimum AAR score of 110, the Institute of Technology requires 120, etc). Along with AAR requirements, many students are accepted into General College under special circumstances and are thus eligible for additional help through the college's TRIO program, which is federally funded. In order for students to qualify for TRIO support, they must meet one of three criteria, which are: (a) the student is a first-generation college student (neither parent has graduated from an institution of higher learning); (b) family income (the student comes from a family with a combined income not greater than the lower one third of the national average); or (c) the student has a documented learning disability or physical disability. Many students qualify for the first two TRIO qualification requirements simultaneously. TRIO students are provided with Supplemental Instruction and other academic services that are supported by funds originating from a grant from the U.S. Department of Education.

## Theoretical Framework

Activities and content for the anatomy and physiology course are designed within the framework of two different models for teaching and learning. First is conceptual change theory, which is frequently referred to by the more general term "constructivism." Basic tenets of the conceptual change theory (Strike & Posner, 1985, 1992; von Glaserfeld, 1995) propose that students come to class with large amounts of prior knowledge, some accurate and some inaccurate. Instruction, then, must account for students' prior knowledge in order for them to gain a more accurate understanding. For example, prior to instruction many students have erroneous conceptions about diffusion, osmosis, active transport, and other forms of membrane transport (Jensen, Wilcox, Hatch, & Somdahl, 1996). Inaccurate conceptions such as these must be directly addressed before new, more accurate conceptions can be learned, hence the "conceptual change" theory.

The second model is Roger and David Johnson's theory of cooperative learning (Johnson, Johnson, & Holubec, 1993; Johnson, Johnson, & Smith, 1998). Class activities frequently require students to work in either formal or informal cooperative groups and many of these activities are structured by suggestions made by David and Roger Johnson or other researchers, such as Slavin (1991), who have worked with cooperative learning. Research by Johnson and Johnson (1989), and many others, supports the use of cooperative groups when trying to implement conceptual change learning strategies (Roschelle, 1992).

In addition to the educational models described above, Bloom's (1956) taxonomy has been used to define and assess higher level thinking processes. The taxonomy of cognitive objectives is arranged in a hierarchy of ascending complexity and abstractness beginning with knowledge

(i.e., retention of information), which is followed by five kinds of intellectual skills and abilities: comprehension, application, analysis, synthesis, and evaluation. In principle, the taxonomy is useful in planning for a desired balance of cognitive demands on students through learning opportunities provided for them (Anderson & Sosniak, 1994; Barbanel, 1987).

## The Curriculum

Biological Sciences: The Human Body (GC 1132) is a quarter-long (ten-week), five-credit course. The curriculum is similar to what many science instructors would call “Human Biology” because it does not have the same academic depth that most traditional anatomy and physiology courses do. This course starts with a brief introduction to biochemistry, cell biology, and histology, then continues with the major organ systems. The nervous, muscular, and immune systems are all taught on a more detailed level to present the students with the rigorous experience that a more advanced science course would provide. Throughout the duration of the semester we modify our curriculum from the initial emphasis on anatomy, which, according to Bloom’s taxonomy, requires lower level cognitive skills, to an emphasis on physiology, which requires higher level cognitive skills. All exams have both anatomy and physiology components, but as the quarter progresses the percentage of questions pertaining to anatomy decreases and that pertaining to the more complex physiology concepts increases; the course’s final exam is based almost entirely on physiology.

### Learning Anatomy: Mastery

As in any anatomy and physiology course, students are required to learn the names of bones, muscles, blood vessels, and so on, but in GC 1132 this is done while operating from the notion of “mastery”; students are expected to answer anatomy questions on quizzes and exams without errors. Three steps are taken to promote a student’s mastery of the anatomy in question:

1. Lists of all required anatomical structures to be learned are provided within the students’ course study guide. The lists are accompanied by simple, unlabeled line-art drawings, for which the students are expected to look up each anatomical structure in the course textbook and label the drawings accordingly.

2. Students are advised prior to an exam or quiz that the anatomy questions are the easiest and that a well-prepared student should not miss any anatomy questions because they have access to all possible questions and answers as provided in the study guide. This advising, which is analogous to a “pep talk,” informs students that there will be no surprises on the test, and that success is achievable through sufficient effort applied to studying.

3. In class we model and promote different studying techniques for students to use while studying anatomy. For example, we demonstrate how students can orally quiz one another on the bones of the skull, and how to practice learning bone identification when they are alone via the use of drawings, flash cards, and other simple learning strategies. We also demonstrate how to use different computer programs to learn basic anatomy.

The intent of the anatomy requirements, besides the goal of learning rudimentary anatomy, is to provide a small domain of information that the students can master. For many students our first anatomy quiz is the first science assessment in which mastery has been achieved. Success on the first quiz of the course increases students' confidence and enhances self-perception as a successful student within a science course. This positive reinforcement is particularly important to students in a developmental education situation in order to facilitate students' development into self-reliant and productive college learners.

### **Learning Physiology: Analysis and Evaluation**

The most intellectually challenging portions of the curriculum are associated with human physiology. Students are expected to learn complex physiological concepts, such as the molecular events of muscle contraction or the membrane events of nerve impulse propagation, and then use the information to answer challenging questions on exams. Our goal is to use the curriculum to promote higher order thinking skills such as analysis and evaluation, but we must also be aware that many students possess misconceptions about simple physiological concepts, such as diffusion and osmosis, that make accurate comprehension of more complex concepts difficult.

Combining conceptual change and teaching for higher order thinking skills is done through a variety of activities that require students to critically examine statements that may appear to be accurate if the students prepossess erroneous information. To facilitate conceptual change and higher order thinking skills we use "error-finding" exercises, as illustrated in Figure 1. The exercises are based on the premise that if students have mastered learning a physiological concept—that is, they possess a correct understanding of the concept—they can then identify mistakes in a description of that concept (i.e., analysis and evaluation). The exercises involve a paragraph or diagram describing some physiological event, and the students are asked to identify all the errors contained therein. Students with incorrect conceptions find these exercises extremely difficult, thus hopefully promoting a more critical analysis of their own ideas and understanding of the concepts. A shorter form of the exercise is replicated on exams wherein students are required to determine the total number of errors within a one or two sentence description of some physiological event.

#### **Figure 1** **Sample "Find the Errors Exercise"**

**Directions:** Circle all the errors in the following paragraph.

An action potential moves down a neuron where it causes Acetyl Choline (ACh) to be released by the mitochondria at the end of the axon. ACh diffuses across the synapses to the receptors on the motor end plate, where the receptor/ACh complex stimulates the repolarization of the muscle fiber.

The traditional curriculum of an anatomy and physiology course requires students to spend large quantities of energy and time at the “knowledge” level of learning (e.g., learning the bones of the skull or muscles of the legs). It is very important however, to give students at least a sample of the higher level thinking skills that will be required for success in most junior and senior level science courses.

## **Methods of Instruction**

All 120 students enrolled in a section of GC 1132 meet for five hours per week with the instructor. Three of these hours are spent in a large lecture auditorium and two are spent in a 30-station computer lab.

### **Lecture**

Students meet in a large auditorium for a traditional lecture presentation for two hours on Mondays and one hour on Fridays. It is in this forum that most of the academic information is distributed. To supplement the traditional lecture format, laser discs, internet materials, and CD ROMs are used via a computer-controlled presentation system. For example, during presentations on muscle physiology, computer images and laser disc simulations are utilized. This is particularly useful in a developmental education setting as so many of the students tend to be visual learners. Some class lecture time is spent modeling the learning of complex scientific concepts by repeatedly expanding on previously learned information. For example, when teaching muscle cell anatomy, the instructor may initially draw a muscle cell on the blackboard, following this with references to specific figures in the textbook (textbook figures tend to be more complete and complex). The instructor will then present images of muscle cells taken from the internet or a CD ROM, images that illustrate the same concepts of cell anatomy previously covered, but at an increased level of complexity. Later in the lecture, students might be asked to draw a muscle cell from memory on a blank sheet of paper. The following lecture may open with an activity in which the students work in pairs to draw a muscle cell, then use the drawing to explain to each other the events involved in a muscle contraction. This extensive cognitive rehearsing serves a twofold purpose. First, it requires students to process the material actively, enhancing the concepts’ reinforcement. Second, it indirectly imparts to the students a variety of study techniques and skills, such as cognitive rehearsal and group study techniques, that may well apply to their other course work.

### **Supplemental Instruction**

The structured Supplemental Instruction (SI) for GC1132 is a graded one-credit class, offered through the General College, which meets for one hour three times weekly. These class times are in addition to the core lectures. The students taking SI classes are generally TRIO students who are considered to be even less prepared for college-level course work than the average General College student. During a structured supplemental seminar, students learn basic study skills and strategies in the context of the anatomy and physiology materials. For example, while learning

the parts of a cell, called organelles, the students may learn how to make and use flashcards, or while preparing for an exam the students may be introduced to strategies in outlining and flow charts. Other study techniques taught in the context of the core material include the Cornell method of note taking (Pauk, 1974; Zimmerman, 1998), previewing and reviewing materials, time management, test question analysis, grade calculation, and preparation for a final. A high level of group work is used in the supplemental curriculum in order to foster interactive learning. Prior to exams, practice tests are given in order to provide the students with practice in test taking skills and to help lessen test taking anxiety. The instructor in charge of the SI will also offer additional voluntary review sessions prior to each exam. Although SI sessions are specifically intended for the registered TRIO students, they have historically been opened to all students enrolled in the class. Voluntary attendance by non-TRIO students is generally quite high.

### **Computer Lab**

Many General College students do not possess the computer skills needed to succeed in college. It is our goal in GC 1132 to integrate computer activities into the course's daily activities so that students can experience how computers can be incorporated into a science course just as they are becoming integrated into the workplace. To help facilitate this goal, students meet for two hours per week in a computer lab where they are assigned three different computer projects. The following benefits are the results of the first computer assignment, which is a medical terminology worksheet: (a) it introduces the mechanics of interpreting medical terminology; (b) it introduces students to the GC 1132 internet home page and a wide variety of internet connections within the U of M system; and (c) it provides an introduction to the finding of information on the World Wide Web via the use of search engines. The medical terminology worksheet is graded on a complete versus incomplete basis, which helps promote the assignment as a very low-stress introduction to computers and medical terminology. The second and third projects are electronic research reports; students are assigned to create Power Point presentations related to some item of normal anatomy and physiology, such as how the knee works, and also to create a Web Page concerning some pathological condition, such as arteriosclerosis. Both projects require students to locate, transfer, and cite information from the Internet, but students are also encouraged to use more traditional sources such as library materials. Students are permitted to work in groups of two or three or individually when completing the electronic research reports. The option of group work is open in order to promote group skills and to ease anxieties related to the use of computers. Along with the projects, students are required to submit an evaluation of their reports that includes: (a) details of what each group member contributed to the project, (b) a point total or grade that they feel is an accurate evaluation of their work (the instructor has the option to agree or disagree with the point totals), and (c) a paragraph that provides an explanation or justification for the proposed point totals. The best projects of the quarter are published on the course's Internet site, provided the students permit their publication, and that they contain no copyright violations, such as images or simulations from other sites.

A very important element in the computer lab is its relaxed atmosphere. Student profile data has indicated that many of our students are “technophobic” and are very anxious about the computer assignments. The computer lab is staffed with one or two teaching assistants who are previous GC 1132 students who know the assignments and are very knowledgeable in the use of computers and helping students. Results of a study focusing on how technophobic students excel in our course show that the two most important items of success are a relaxed atmosphere where naivete is not criticized and computer skills are not assumed, and helpful teaching assistants.

### The GC 1132 Web Page

All GC 1132 students are expected to access the GC 1132 Web Page on a regular basis ([http://www.gen.umn.edu/faculty\\_staff/jensen/1132/](http://www.gen.umn.edu/faculty_staff/jensen/1132/)). The purpose of the page is the posting of current and relevant course information for students enrolled in the class.

**Schedule information.** All weekly schedule information is documented on a page titled “What the Heck Is Going On.” Typical postings include assignment due dates, dates of quizzes and exams, instructor and teaching assistant office hours, and review session meeting times. We open every lecture session by first viewing the “What the Heck Is Going On” page.

**Grade reports.** Approximately four hours after an exam, the site is updated to show test results and a statistical summary of each student’s overall performance in the course. All data are recorded and reported via randomized identification numbers to maintain students’ privacy. Students have the option to request that their scores be omitted from the Web listing, although no student has done this. Using the Web to post grades provides a quick method of furnishing feedback as students need not return to campus, or even wait until the next class period, to view their grades.

**Web anatomy.** The most used portion of the GC 1132 Web Page, according to access log data, is an interactive tutorial program called Web Anatomy. Web Anatomy was created by the author Murray Jensen as a learning tool specific to GC 1132 (Web Anatomy can be accessed at: [http://www.gen.umn.edu/faculty\\_staff/jensen/1135/webanatomy/](http://www.gen.umn.edu/faculty_staff/jensen/1135/webanatomy/)). Web Anatomy’s program screen consists of three distinct areas. First is an area in which anatomy and physiology questions are posed in text form, graphics, animation, or sounds. Students select their answers from the second area, a pull-down menu that contains a large list of possible answers, one of which is correct. (We use large lists of distracting wrong answers to reduce the possibility of guessing a correct answer.) After entering answers, students press a button to enter a third area where they may immediately check their test results. Students are able to review their performance and repeat the exercise as often as they wish. No official grades of student performance are recorded in Web Anatomy. The intent here is to keep the exercise very low pressure to insure the comfort of the students as they practice their understanding of anatomy and physiology. Students frequently use the same program repeatedly to master their knowledge of a specific physiological event or lists of anatomical structures. The intent behind this Web Anatomy program is to provide the students with the ability to master certain portions

of the course requirements. This is significant because when taking a quiz on the bones of the skull students must be able to be confident in their knowledge.

## Student Reaction Data

During the tenth and last week of the course, students are asked to complete a survey relating to their experiences with the different forms of technology used in the course. The intent of the evaluation has been to determine which computer activities should be modified, improved, or perhaps dropped, and also to measure the students' opinions of the use of technology in the course. The following summative data was calculated from the 224 students

Table 1

### Students' Opinion on the Number of Computer Activities in the Course

Which of the following statements do you agree with most?

	n	(%)
This course should use more computer activities	44	(20%)
This course should use the same number of computer activities	151	(67%)
This course should use fewer computer activities	19	(9%)
This course should not use computer activities	10	(5%)
<b>Total</b>	<b>224</b>	<b>(100%)</b>

Table 2

### Individual Rating of Computer Skills

<u>Ranking</u>	<u>Pre</u>		<u>Post</u>	
	n	(%)	n	(%)
1 - poor	13	(6%)	0	(0%)
2 - fair	52	(23%)	13	(6%)
3 - OK	78	(35%)	67	(30%)
4 - good	62	(28%)	99	(44%)
5- excellent	19	(8%)	45	(20%)
<b>Total</b>	<b>224</b>	<b>(100%)</b>	<b>224</b>	<b>(100%)</b>

PRE: Which of the following best describes your ability to use computers prior to this course?

POST: Which of the following best describes your ability to use computers now that the course is almost completed?

Table 3

Table 3

## Students Access to the GC1132 Web Site

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 How many times per week did you access the GC 1132 Web Site?

	n	(%)
never	0	(0%)
once a week	40	(18%)
2 or 3 times a week	82	(37%)
4 or 5 times a week	84	(38%)
6 or more times a week.	18	(8%)
Total	224	(100%)

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Table 4

Student's Use of the WebAnatomy Review Program


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 A. How often did you use Web Anatomy?

	n	(%)
1 - never	2	(1%)
2 - rarely	3	(1%)
3 - a little	25	(11%)
4 - often	100	(45%)
5 - a great deal	94	(42%)
Total	224	(100%)

B. How effective was Web Anatomy at helping you prepare for quizzes and tests?

	n	(%)
not at all	3	(1%)
a little	2	(1%)
a fair amount	16	(7%)
quite a bit	63	(28%)
an exceptional amount	140	(63%)
Total	224	(100%)

C. Were you able to use Web Anatomy from your home or dorm?

	n	(%)
1 - No - I don't have access to the Internet where I live	49	(22%)
2 - No - but then, I never tried	2	(1%)
3 - No - I tried a few times but never got it to work	15	(7%)
4 - Yes, but it was a struggle almost every time	24	(11%)
5 - Yes - I used it and it was easy to get to almost every time	134	(60%)
Total	224	(100%)

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who completed the surveys in the 1997 through 1999 academic years. As indicated in Table 1, 67% of all students reported that the number of computer activities in GC 1132 should be maintained. Very few students advocated fewer computer-based activities.

Table 2 demonstrates that students' perceptions of their ability to use computers improved during the course, although we have no evidence of students' prior computer experiences or requirements in other classes. As shown in Table 3, use of the course's Web Page was very high and students reported few difficulties in accessing the site. Students reported frequent use of the Web Anatomy review program, including from home, and also indicated that they found the programs easy to use and beneficial for preparing for quizzes and exams, as summarized in Table 4.

## Conclusion

Teaching anatomy and physiology within the context of developmental education requires the restructuring of traditional science course goals. Decisions have to be made regarding how to best accommodate students' academic needs with specific concepts and activities. Our anatomy and physiology course is an atypical science course in that we do not intend to cover all the information in the book, but rather we use the curriculum and instruction to create activities that promote the development of academic skills. We have found that blending the traditional anatomy and physiology activities, such as learning the bones and muscles, with computer activities like Web Anatomy, helps to both facilitate the development of students' study skills and to assist students' acquisition of computer skills. In addition, by focusing on a few specific units in depth, such as the muscular system, and requiring students to complete activities that involve the analysis and evaluation of technical physiology concepts, such as finding the error exercises, students are provided with the opportunity to practice the more advanced academic skills that will be required in future course work.

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# A Research Based Approach to Developing a Computer-Assisted Course for Developmental Students

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## Abstract

*This case study describes our research approach to developmental education. Our purpose is not to prescribe specific academic interventions for adoption by developmental educators but to present ideas for consideration that are backed by our research. We present a model for computer-assisted, mastery-oriented pedagogy to teach subject matter and to increase students' self-regulating studying behavior. Our goals are for students to take control of their learning, develop a sense of self-efficacy, acquire good study habits and skills, and persist until they are successful. We discuss several research options that support the validity of our model.*

The use of technology in education is a bit like Mark Twain's remark about the weather—everybody talks about it but few actually do much about it (Munson, 1992, p. 64). Fortunately, this is not entirely the case for developmental educators. For example, a wealth of information about technology rich coursework created by developmental educators exists at a web site created by developmental education faculty at the General College of the

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University of Minnesota as part of a project funded by the Annenberg Foundation (<http://www.gen.umn.edu/research/currtran>). The project's aim was to identify uses of technology in developmental education that facilitate curricular transformation (Brothen, 1997). We believe that to be transformative, technology in developmental education should contribute to a student-centered curriculum that helps students learn how to learn (Brothen, 1998). Such a transformative technology should make it easier for students to choose when learning is to occur and to structure it for themselves. Meaningful and timely feedback and the opportunity to try things over and over provide the conditions for mastery and the development of confidence. Although this is beneficial for all students, we believe it is crucial for developmental students. Taraban and Brothen (1999) recently issued a call for developmental educators to apply the new technologies effectively. This case study provides one example of how to do that.

In this chapter, we describe our introductory psychology course, which is part of the developmental education curriculum of the General College at the University of Minnesota, and the research we have done on our teaching methods. We recognize that few developmental education programs include social science courses in their curriculum and that developmental educators are unlikely to adopt all the interventions we use in our course. Our purpose is to present ideas backed by research that others can choose from to use in their own ways in their own courses.

## Theoretical Background

For the past decade, we have investigated the impact of computer-assisted instruction and mastery-oriented pedagogy on developmental students' learning in psychology (Brothen, 1992). Our work is guided by Bloom's (1976) classic formulation of the mastery learning model in which he suggested that students with academic deficiencies can be nearly as successful in mastery learning courses as well-qualified students. We use Keller's (1968) Personalized System of Instruction (PSI), a mastery learning teaching method that shows special promise for developmental students. In their meta-analysis, Kulik, Kulik, and Bangert-Drowns (1990) found superior student learning in PSI compared to traditional forms of instruction, with this advantage even greater for students with lower academic ability. Noted educational researcher James A. Kulik recommends that teachers of developmental students consider using PSI (Bonham, 1990).

Traditional PSI has four distinguishing characteristics (Buskist, Cush, & DeGrandpre, 1991). First, there is emphasis on written materials rather than lecture as the major teaching activity. Instead of presenting information to students orally, instructors select or write appropriate reading materials, write behavioral objectives and study questions, and prepare multiple forms of tests that measure student progress and provide feedback. Second, students pace themselves through the course, finishing assignments based on their own circumstances. Flexibility is a cornerstone of the method and is based on the realization that students have many other obligations and learn at different rates. Third, the course is broken down into manageable units that students are to master before they move on to the next. Mastery is determined by successful

completion of short unit tests that provide feedback to unsuccessful students so they may remediate deficiencies before trying again. Finally, undergraduate proctors typically have been used to score tests and help students understand what their deficiencies are and what they need to do to deal with them.

We have depended heavily on the concept of self-regulation (Zimmerman, 1989) to structure our course. We strive to increase students' self-regulated studying behavior to improve their sense of self-efficacy and belief in the importance of acquiring good study habits and skills. For example, Wambach (1993) showed that developmental students successful in their first academic term in college can be characterized as those who have a sense of self-efficacy about their education and have acquired the study skills they seem to have missed in high school.

## **Course Overview**

Our course is based on a research and development project in progress. We are very open in communicating this to students. On the first day of classes we tell them that as part of their experience they will be participating in our research. We have them read and sign an informed consent form that describes our research and asks for their permission for us to use their course performance and other academic records confidentially. No student has ever refused to participate. Guided by our research findings, we have implemented a number of research-based features to help our students to become successful.

### **Classroom and Equipment**

Each year we team-teach 12 sections of an introductory psychology course in a 41 station networked computer classroom (Brothen, 1992). All exercises and quizzes are created with a course delivery system (Brothen, 1995) that records student scores and daily activity in individual log files for subsequent analysis. We use these data in our research program. We have modified the traditional PSI format to meet the needs of developmental students and to facilitate their acquisition of self-regulated studying behavior (Brothen, 1994; Mace, Belfiore, & Shea, 1989; Stahl, Simpson, & Hayes, 1992). Our computer network keeps records and provides students with feedback on their progress while a staff of two instructors, two graduate teaching assistants, and several undergraduate teaching assistants provide personal contact. Students work during class on computerized exercises and, when they feel sufficiently prepared, take chapter quizzes at quiz computers located at the back of the room. They can also do the computerized exercises in campus computer labs evenings and weekends.

### **Personal Contact**

We coach students on effective ways to use course materials and the staff closely monitors student progress and approaches students who appear to be having difficulty. The college requires that we submit an end of fourth week (of an 11 week quarter) progress report that informs students and their advisors of their preliminary grade and general course progress. Our

system allows us to say exactly what a student has done up to that point. It also allows us to identify procrastinators, a concern in PSI courses.

Our systematic examination of the procrastination issue revealed that students did not feel particularly anxious about actually being behind in their coursework. Neither was it their intention to put more time into their coursework to actually doing something about catching up (Steel, Brothen, & Wambach, unpublished manuscript). This seeming lack of anxiety about “being behind” and the apparent lack of connection between intentions and action pose problems for all developmental educators.

We have addressed this problem in the context of students who avoid taking quizzes in our course. We personally contacted and elicited a commitment from procrastinating students to take their first quiz. Making the commitment and actually following through led to an increase in their total time working in the course and to better grades (Brothen & Bazzarre, 1998). In this study we concluded that a brief personal intervention focused on a specific behavior (e.g., taking a quiz) is productive in several ways. Developmental students may simply need to “do it” to discover that the work is not so difficult as they thought and this discovery may be enough to stimulate a more effective work orientation. We have found that such a “personal approach” is just what some developmental students need to set them on the path to becoming successful academically.

### **Self-Regulated Studying Behavior**

In an article applying research to teaching, Stahl, Simpson, and Hayes (1992) recommended that instructors help developmental students establish self-regulated studying behavior. Zimmerman (1989) defines this behavior as “actions and processes directed at acquiring information or skill that involve agency, purpose, and instrumentality perceptions by learners” (p. 329). Central to Zimmerman’s concept is self-observation, which “refers to students’ responses that involve systematically monitoring their own performance” (p. 333). Self-regulated learners (a) monitor their performance on a regular basis, (b) behave purposefully, (c) seek aids useful to success (i.e., that are instrumental), and (d) complete coursework successfully. We try to instill these behaviors in our students in several ways. For example, in their book on techniques to create self-regulated learners, Zimmerman, Bonner, and Kovach (1996) suggest creating self-monitoring forms for students to fill out. The first page in our study guide is just such a form. We instruct students to record their progress as they complete exercises. As our assistants correct study questions they check the record sheet and encourage students to keep their record up to date.

Also, students in our classes can monitor their performance by accessing a computerized gradebook that is updated daily. It reports their point status on exercises, study questions, and quizzes. In an evaluation of the gradebook software (Brothen, 1996b), we found that students’ checking of their grades encourages behaviors relevant to self-regulation of learning. In this study, checking grades was associated with positive student behaviors such as accumulating points and studying for the final examination. We found that as students increase their self-

monitoring they devote both more time and energy to their studies, attributes of self-regulation. By simply checking their grades more often, students were changing their orientation to become more self-regulated in their approach to learning.

### **Expectations**

One requirement of an effective “mastery learning” teaching model is clearly stated requirements and expectations. We use criterion-based final grading with a 90% performance level translating to A, 80% to B, 70% to C, and 60% to D. Also, instead of stipulating that students earn either an A, withdraw, or earn an F grade, as is often done in PSI courses, we assign the full range of grades to accommodate students who may not yet be able to function at the A level. Our syllabus includes a recommended schedule for completing 19 textbook chapters that is reinforced throughout the term by the instructional staff. If students’ self-pacing drops significantly below these expectations we talk to them and contact their advisors directly or by sending an “academic alert” form provided by the college. At the same time, however, we realize there is just so much we can do. In a recent study (Brothen & Wambach, 1999), we found that nonperformers in our classes did not differ from our other students on the American College Testing (ACT) Program’s Comprehensive Examination and high school grades. Instead, students who failed had a variety of academic and personal problems that contributed to academic failure in our course and others.

Not only do our unsuccessful students experience academic problems, their problems are not easily addressed by the college’s student support system. Advisors are equipped to assist students who need to establish goals, acquire study skills, and learn about university procedures, but they are not equipped to help students who have serious health, family, and personal maturity problems. Thus, it may not be possible for us as educators to do much about personal or family strife. However, a mastery teaching system like PSI can help us distinguish early between academic and non-academic reasons for non-performance. We provide the monitoring of performance in the classroom essential to identifying students who need assistance if they are to be successful. That information can help students improve academically or make them and their advisors aware that academic pursuits may have to be delayed until other issues are dealt with.

### **Surviving without Lectures**

It is often a surprise for our students and our colleagues and other interested individuals within and outside the General College to discover that we do not lecture, ever. Whereas PSI is a non-lecture based teaching method, it is also adaptable to lectures. Lectures in PSI have been used primarily to motivate students with interesting delivery techniques but have minimal effects on student learning (Buskist, Cush, & DeGrandpre, 1991; Sherman, Ruskin, & Semb, 1982).

Over the past several years there has been an explosion of technology designed to make lectures more interesting and, implicitly, more effective at fostering learning. Because of the large, profitable market and stiff competition, textbook publishers (especially of introductory

psychology texts) have sought to obtain a market edge by providing instructors with technology supplements. Presentation aids such as slides, transparencies, audio and video tapes, laser disks, and compact disks are designed to enliven lectures. To determine if our developmental students would benefit from lectures, we experimented with lecturing in our system. We were interested in discovering whether traditional lectures “spiced up” with some of this technology would add a useful dimension to our course.

An evaluation of our technology enhanced lectures (Brothen & Wambach, 1999) showed that they did not measurably enhance our course outcomes. These results are consistent with other research suggesting that lectures are less effective than a variety of other more active strategies for increasing student learning such as discussion (McKeachie, 1994) or cooperative learning (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Our results are also consistent with Twigg’s (1994a, 1994b, 1994c) observation that the traditional lecture classroom is a learning technology that is simply out of date. The “talking technology” of lectures may have made sense in an era before it became so easy to get instructors’ thoughts into print and into students’ hands. However, several centuries of technological development from the printing press to the World Wide Web have made lectures inefficient as a means of delivering information.

Despite evidence that lectures do not contribute much to learning when the information is available in print, both faculty and students find it hard to give them up. Many academic administrators equate lecturing with teaching and are suspicious of other techniques as ways to avoid work (fortunately, ours are supportive). Faculty believe that “covering the material” (that is, speaking it aloud to students) is their most important role. Students expect faculty to “teach the class,” which also means speaking from the front of the room. They do not view personal interaction with the instructor as teaching. It is not unusual for students in PSI classes to report on course evaluations that the instructor “did not teach the course.”

## **Basic Elements of Our Course**

### **Programmed Instruction**

We designed the elements of our course to both teach psychology and to help students develop as effective learners. To do this we have followed the lead of researchers working on self-regulation theory (Zimmerman, 1989). This theoretical perspective puts a premium on feedback; students need to learn how to use it and to value it. But proper feedback amounts to more than simply telling students they are wrong or right.

Kluger and DeNisi’s (1996) Feedback Intervention Theory (FIT) describes how feedback should be structured. The FIT approach demands that feedback must be (a) specific to the task, (b) corrective, and (c) done in a familiar context that shapes learning. Each of these three points helps us decide what students should be doing and how teachers should be responding to them. First, general, non-specific feedback (e.g., “You almost know it”) is much less performance enhancing than task information feedback (e.g., “Your quiz score shows you need more study on the difference between classical and operant conditioning” (c.f., Balzer, Doherty, & O’Conner,

1989). Second, corrective feedback should be tailored to individuals to help them improve. This implies that the feedback must be delivered by a responsive instructor who knows the student or by “intelligent” technology (i.e., computers) that can judge and track the student’s responses. Third, the task feedback should be embedded in the course activities rather than external to it. That is, as students do coursework, they should be receiving feedback on those activities. Summative evaluations such as “report cards” are not as effective for students to adjust their behavior as knowing constantly how they are doing on the tasks at hand. For example, study skills and other interventions that are made part of the coursework that determines student grades rather than serving as adjuncts to the course are more effective for changing student behavior (Hattie, Biggs, & Purdie, 1996).

From the above paragraphs it should be clear that a learning task is important. Just what kind of a task and how it is structured is a crucial question. A good place to start to answer this question is Boekaerts’ (1995) assertion that “all learning processes are behavioral change processes” (p. 199) and that teaching and learning interventions should begin as very prescriptive. In addition, Eisenberger (1992) has proposed in his learned industriousness theory that getting students to start working creates a general work orientation in them. Therefore, our students begin each course unit by completing a computer-assisted programmed instruction exercise on terminology.

We created these prereading exercises for each of the textbook chapters after a study several years ago (Brothen & Schneider, 1993) showed that students had not been learning terms adequately and that a computerized terminology exercise improved their final exam performance. In our current exercises students see the definitions of each of the chapter’s terms. They then type three key words after each “disappears” from the computer screen. The exercise is designed simply to familiarize students with terminology to make it more understandable when they read the chapter. They receive two points for completing each chapter exercise. The exercise is easy for almost all students and starts them on their way to mastering the chapter. An unpublished evaluation of their effectiveness revealed positive correlations between exercise completion and chapter quiz scores.

### **Study Questions**

We wrote a study guide that consists of factual study questions for students to answer and turn in during class to be corrected and returned immediately by teaching assistants. We wrote a total of 819 study questions over the 19 chapters of our textbook (Myers, 1998). The study questions serve as learning objectives and the short answers students write create a summary of the textbook. Students receive two points each for turning them in on time. This is designed to help them stay on schedule during the academic term. Students also must complete the chapter study questions to get credit for their chapter pretest described below.

We recently completed an evaluation of the usefulness of our study questions (Brothen & Wambach, unpublished manuscript a). Overall, our students completed 96% of the study question assignments. To do the study questions adequately, students have to read their

textbooks. Our data clearly showed that study question completion is related to subsequent chapter quiz performance. Most students (82%) completed the study questions and those who achieved higher scores did better on quizzes. Some students (14%) procrastinated and had to rush to complete their study questions and take chapter quizzes. They performed less well on quizzes.

The students who did not do their study questions at all did poorly on quizzes. Our quizzes demand a detailed knowledge of each chapter. Students have to read their textbooks carefully and remember a great deal of content. Most likely, these non-completers were much like the “surface strategy readers” (i.e., using only summaries, bold face terms, etc.) described by Beyeler (1998). However, the non-completers did not have the easy alternative that Beyeler’s students had. Because we do not lecture, students cannot “get by” on lecture notes. Surface strategies will not work if the quizzes measure detailed knowledge as ours do. Students must read the text carefully to be successful. Our 819 study questions are designed to ensure that students read, a crucial college survival skill.

We find the effort involved in creating the study questions worthwhile from several perspectives. Creating the study questions ourselves forces us to do a deep reading of the textbook. This provides a good basis for selecting and writing quiz items and developing other assignments. It keeps us very current with changes in textbook editions or the new book if we decide to change texts. And because we do not depend on well-worn lecture notes to structure the course, we simply do not have the luxury to disregard the textbook author’s approach. We believe that instructors who want students to learn the course material need to find ways to get students to read their books carefully. We have found that factual study questions accomplish this task nicely. Students are “shaped” by our method. They get points for completing the study questions and find that doing them is helpful for the later, higher point activities for each chapter. We recommend that instructors of courses serving developmental students create and use factual study questions.

### **Pretests and Progress Quizzes**

A distinguishing characteristic of PSI is an emphasis on written materials rather than lecture as the major teaching activity. Instead of presenting information to students orally, instructors select or create appropriate reading materials, create behavioral objectives and study questions, and prepare multiple forms of tests that measure student progress and provide feedback. The objective is to help students attain mastery. Mastery is attained through small unit tests that provide corrective feedback. We have separated the testing process into two steps. The first step helps students get feedback on how well they absorbed the material from their reading assignment and study questions before they take quizzes.

To accomplish this we created a set of computer-assisted chapter pretests that students have to master before they can take chapter quizzes. These exercises present 10 fill-in-the-blank questions randomly selected from a large pool of items. The questions are topic sentences taken from the textbook with a key word missing and students can use their books to find the answers.

We based the items on the study questions and, to reinforce that connection, we require students to complete the chapter study questions before we count their pretest scores. We define 80% knowledge of the material as mastery, so a score of eight is required before students can take a chapter quiz. Students can take the pretests as many times as they like and often use them as a study exercise before they take quizzes and after they get a low quiz score. To encourage students to continue working beyond mastery, eight correct is worth one point, nine is worth two, and ten is worth three points. Wrong answers on the pretest result in feedback telling students what they missed and where to go in the text to remediate their deficiencies. Once students feel confident in their chapter knowledge, they move on to the second step, the chapter Progress Quiz.

Students can take our computer-assisted chapter quizzes five times each with the highest score counting toward their grade (10 multiple-choice items drawn randomly from a large pool; 100%=A+, 90%=A, 80%=B, 70%=C, 60%=D). After they take the quiz, students receive feedback consisting of a restatement of the questions they missed and textbook page numbers on which the answers can be found.

In a recent study (Brothen & Wambach, unpublished manuscript b) we found that our computer-assisted testing is effective in helping students improve their performance on quizzes over the academic term. This is consistent with our goal of improving the academic skills of our developmental students. The data from this study increased our confidence that our methods help them become better at that most ubiquitous of tasks facing any introductory student, the multiple choice test.

### **Analytic Writing**

We give our students a personality test on the first day of classes. Students then do a worksheet that has them compute z-scores. This shows them how much their scores deviate from the population mean. Their attention is kept by this task because the subject matter is their own personality. They then write four short essays over the academic term (worth four points each) related to their own scores.

The ability to write analytic essays is important to students' future success in social science courses. A survey of faculty teaching popular beginning courses in a variety of disciplines in University of Minnesota colleges to which General College students typically transfer found that 85% of the social science faculty required some writing in their courses (Wambach, 1998). These faculty most commonly reported writing taking place on examinations, but analytic essays and term papers were required in many courses. The survey also asked faculty to indicate the qualities they valued in student writing. The most highly valued qualities among social science faculty were "critical logical thinking," "develop argument," "state position," and "meets the intentions of the assignment."

Our writing assignments help develop students' abilities to write analytical essays that reflect these qualities. In addition to the writing-to-learn experience provided by the concrete study questions focused on content knowledge, the essays enhance the analytic writing skills

students are learning in their college writing courses. We are currently doing an analysis of all student essays from fall and winter quarters of the 1998-99 academic year. We are looking at how students' analytic writing abilities improved over the academic term and how that might be affected by their freshman composition courses.

### **Practice Final Exam**

We created a computer-assisted practice final exam students take to prepare for the final exam. It presents items randomly drawn from a large pool of items similar to those on the actual final. An evaluation of the practice final (Brothen, 1994) demonstrated its effectiveness in helping developmental students become independent learners who possess a positive sense of their ability to succeed. It validated the executive monitoring approach to the development of self-regulation in learning proposed by Thomas and Rohwer (1986). First, the exercise induced students to appraise their level of preparation on their own schedules. Second, the corrective feedback it provided facilitated deployment of a focused study plan. And third, retaking the test allowed students to assess their progress at any time.

The data showed that students who used the practice final did better on the final examination. The exam feedback gave them a way to focus their studying to improve their performance. This, in turn, was associated with both their perceived and actual ability to study and learn difficult material. We believe our practice final examination fosters these important characteristics in our students.

### **Final Exam**

All students take a computer-assisted 100 item multiple-choice comprehensive final exam that constitutes 23% of the course points. Students see their score when they finish. Our computer software also records each answer so that we can analyze performance on sub-sets of the exam. We use final exam scores to evaluate our methods and as a general research tool. We also believe it is a fitting cap to the course; students need to reflect on what they have learned. Accordingly, the items stress general applied knowledge, concepts that students should find useful later in school and life. Also, because final exams are a fact of student life, developmental students need to learn how to prepare for them and take them. In conjunction with the practice final exam, the final exam is designed to help students learn how to survive this important part of academic life.

## **Conclusions**

Our research over the past several years supports the validity of our model. In addition, consistent majorities of our students receive final grades of A or B. True academic Fs are rare. Most of the small number of students not completing the course are unsuccessful not because of an inability to understand the material, but rather because they simply do not engage it for other than purely academic reasons. For example, we compared high performers (students receiving A grades) and nonperformers (students receiving F grades) in our course model (Brothen 1996a).

High performers persisted until they were successful while nonperformers simply did not work as hard (e.g., completed fewer exercises and persisted less at retesting). As noted above, we have also shown that students' failure to work hard in the course was not specific to the class but, rather, part of a general pattern of class failure attributable to nonacademic factors such as personality, health, or family variables (Brothen & Wambach, 1999).

We have found that the only way to predict student nonperformance is close observation of behavior during the academic quarter. As we have pointed out in a previous publication (Wambach & Brothen, 1990), it is extremely difficult and may be counterproductive to predict the success of developmental students before they try college. We feel that our modified PSI system is particularly appropriate for developmental students and allows us the opportunity to detect students' nonperformance immediately. Those of our students who need to prove they can do college level work do so quickly and efficiently. Students needing academic interventions get immediate feedback telling them so and have ready and immediate access to staff attention, and students with serious personal issues interfering with their academic performance are identified. Our research demonstrates that nonperforming students in our course are highly likely to have serious personal problems needing nonacademic intervention. Although we as educators might not be able to do much about personal issues other than to make referrals to appropriate campus or community resources, PSI at least allows us to make students better aware of how to pursue academic success.

For numerous reasons, we are advocates of PSI with developmental students. We have united PSI with technology in a model that serves our students better than the traditional modes of college instruction. As one of us has recently pointed out (Brothen, 1998), developmental educators must break out of the presentational paradigm in their use of technology if they are to transform our field to help developmental students become independent, successful learners.

Although we rely heavily on computer-assisted instruction to deliver our course, the principles behind the activities we use also apply to environments where computers are not available. Paper and pencil study guides are particularly useful, as are any classroom exercises that focus students on a close reading of the textbook. Collaborative group work can provide students feedback on their learning and information on how other students learn. Opportunities for feedback and retesting after quizzes have been part of PSI instruction since its inception more than 30 years ago. We recommend the strategies discussed above to developmental educators regardless of their access to technology.

Those of us working in developmental education should keep in mind that our basic goal is changing students' behavior. Our instructional methods should be designed to make students grow and develop as students who are successful because they have taken control of their learning and to persist until they are successful. PSI is uniquely designed to accomplish this and we think our adaptation of that framework has proven to be particularly successful with developmental students.

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# Developmental Math Students Meet Success In a Cooperative Program Emphasizing Concepts

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## Abstract

*Developmental mathematics students can succeed at the developmental level, then continue successfully in future mathematics courses. This chapter will describe techniques used in a successful program that experiences less than 10% drop rates and as high as 80% pass rates. The program aims to guarantee consistency to students, instructors, and the university. Three major elements of the program make some assurances possible: (a) departmental placement policies, (b) cooperation among developmental mathematics instructors, and (c) emphasis on concepts in the developmental mathematics courses. This chapter will describe the practical aspects used to implement these three major elements for continuous success.*

**F**rom its inception, the people involved in the organization of the developmental mathematics program at Eastern Michigan University recognized the importance of emphasizing mathematics concepts with developmental mathematics students. Initially, instructors sought methods that would ensure students' success in each topic before building

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new concepts based upon those foundational topics. Eventually, the mathematics department acknowledged the need to enforce placement guidelines for all entry-level courses. These placement guidelines have contributed significantly to the shape and success of the developmental mathematics program. Cooperative agreements and organization among the developmental mathematics faculty guarantee that students meet consistent placement guidelines with consistent mathematical concepts.

## Placement Guidelines

The mathematics placement program uses a computerized placement test from a college testing service (College Placement Testing Service) to determine appropriate placement for students desiring to enroll in an introductory mathematics course. An entering freshman takes the placement test if the student's score is below 19 on the mathematics portion of the American College Test (ACT) or if the student wants to demonstrate higher abilities in mathematics than indicated by initial placement criteria. Any student who chooses to take the introductory developmental mathematics course may do so without taking the placement test or showing proof of placement. Students who seek enrollment in any other entry-level course must show proof of placement. Entry-level courses include Introductory Algebra, Intermediate Algebra, College Algebra, Plane Trigonometry, Math for Elementary Teachers I, Mathematical Reasoning, Topics in Precalculus, Math Analysis for Social Sciences (also for business majors), and Calculus I. Proof of placement includes appropriate scores on the mathematics section of the ACT or equivalent levels on the Scholastic Aptitude Test (SAT), passing prerequisite courses, or appropriate scores on the placement test. About 60% of entering freshmen place into a first mathematics course via appropriate scores on college entrance exams. However, developmental students often struggle with mathematics in every setting, including college entrance exams. These developmental students are the primary focus of this program.

Students must receive permission to register for a developmental mathematics course. This simple procedure provides the developmental mathematics instructors an opportunity to talk with each potential student individually. The official title for every developmental mathematics instructor is teacher/placement specialist because each instructor helps facilitate these individual placement discussions. During the one-on-one conference, the placement specialist helps the student to determine the appropriate plan of action based on that student's personal mathematics history. Developmental mathematics students fit a variety of descriptions. Some students have not had a mathematics course for a number of years, others missed some topic (i.e., have gaps in their mathematics knowledge), while others have always struggled with mathematics. When the developmental mathematics instructors speak with students about appropriate placement, they try to address these concerns with the students. Furthermore, developmental mathematics students may or may not experience various levels of math anxiety or test anxiety. Students who experience high levels of test anxiety, or who feel uncomfortable with mathematics, are often relieved to know that they can register for the entry level developmental mathematics course without taking the placement exam. Students who feel

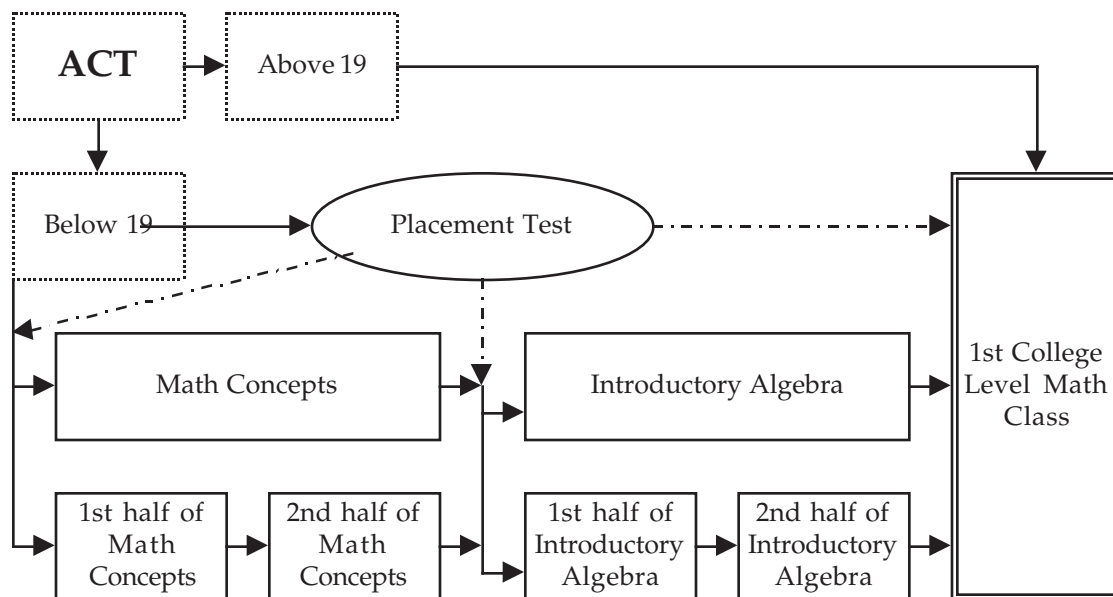
confident about their mathematics abilities, yet get placed into a developmental mathematics course, are often encouraged to know that they do not need to take “five math classes” before they can enter their major field of study. During the personal counseling session, an advisor reviews details of placement options pertinent to the individual student’s plan of study, as discussed below. This aspect of the placement policy lends flexibility to the developmental mathematics program.

Students needing developmental mathematics courses have several options, as shown on Figure 1. Two basic courses, a first course on mathematical concepts (arithmetic and prealgebra) and a second course on introductory algebra concepts, are each split into two halves. Therefore, a student can take the entire first course in one semester or the first half of that course in one semester. Students choosing the entire first course can move on to the second course on algebra concepts the following semester. A student who chooses to take only the first half of the first course might take four semesters to finish the four halves of the courses. However, at the end of each course, a student has the option of taking the placement test to place out of the next developmental course. This allows students to progress at a quicker rate. For example, a student with good algebra skills might take the first half of the first developmental mathematics course then demonstrate readiness for a college level mathematics course via the placement test.

These six course options coupled with the placement system allow students flexibility within the system. Students who have always struggled with mathematics, and who also suffer with

Figure 1.

Developmental Mathematics Placement and Sequencing



math anxiety, often choose a slower pace by taking each of the halves in subsequent semesters. Confident students, who need only a brief review of mathematics, have found that after successfully completing one developmental mathematics course they recall the mathematics necessary to allow successful completion of college level mathematics courses. Other students may experience success in the first developmental course and decide to build upon that success by continuing with the next developmental mathematics course.

The placement system allows students freedom of choice. A student may choose to retake the placement test after 30 days. If the second set of scores does not demonstrate an acceptable placement level, the student can choose to wait another 30 days to retake the placement test a third time. During the 30 day waiting period the student may study individually, consult tutors, take a course, or do nothing. After taking the placement exam three times, the student may choose to sign a waiver indicating that he or she may fail but chooses to take the course anyway. Placement specialists strongly discourage students from choosing to sign the waiver, but it is an available option. Although students may not frequently choose the waiver option, they do choose to ignore placement criteria for a semester, or a year, or longer. The other problem, common to an individual's freedom of choice, occurs when a student takes the first developmental mathematics course, then fails to register for the subsequent course for a semester, or a year, or longer. The primary source of these difficulties comes from inappropriate decisions made by individual students. Nevertheless, a highly successful developmental mathematics program has emerged. Cooperation among the developmental mathematics faculty serves as the main impetus for the success of the program.

## Cooperative Ideals

Many mathematics departments consist of an assortment of individuals who hail from disparate cultural backgrounds, who embrace distinct educational philosophies, and who believe in a variety of teaching styles. The developmental mathematics program at this university is no different from other mathematics departments. Given faculty diversity and many potential areas for disagreement, all of the instructors in the developmental mathematics program concur on essential elements of the program. These essential elements include grading policies, testing criteria, and placement guidelines. The developmental mathematics program at this university is unique in its policy to hire only full time faculty to teach the developmental mathematics courses. This policy facilitates cooperation, which allows instructor autonomy within the classroom while ensuring the students, other faculty members, and the university definite outcomes from developmental mathematics students.

### Grading Policies

Grading guidelines are a crucial element of the developmental mathematics program. All of the developmental mathematics instructors follow the same grading guidelines. Before beginning a new semester, the faculty meets to discuss any changes or adjustments deemed necessary to maintain consistent and fair grading policies. All developmental mathematics

instructors agree on the content of material as well as the level of proficiency that a student should obtain to earn a C, a B, or an A, or any other grade. The grading policies are distributed to each student at the beginning of each semester. A student must pass a developmental mathematics course with a C or better for placement into the subsequent course. A student who earns a grade below this minimum must retake the course or demonstrate knowledge of the material by passing the placement test. Therefore, it is assumed that a student who passes a developmental course with a C or better has the knowledge and skills needed to pass the next mathematics course. In general, this system works. Mathematics faculty members report that students who come from the developmental mathematics courses do well in the subsequent courses. Developmental mathematics instructors may calculate grades with individual formulas, and interpret the grading guidelines separately, but the grading policies are followed consistently by the faculty. Often, when an instructor encounters an individual student whose grade may seem subject to interpretation, the instructor will discuss the situation with another developmental faculty member for confirmation. In these situations, the instructors often concur. As a result of this consistency, the mathematics faculty knows that any student from any developmental course who has earned a C or better has achieved specific and consistent levels of skills and knowledge regardless of the instructor who taught the student.

### Testing Criteria

The developmental mathematics faculty developed testing criteria when the program began. One or two instructors usually write the tests for each of the courses, then distribute drafts of the test to the other instructors for comment and revision. In this way, all instructors have input into each test. Perhaps the most important provision of the testing policy is that every student must earn an 80% or better on each test. If a student does not perform at this level on any test, the student must follow the recommendations of her or his instructor before retaking the test. The student must continue this process until he or she achieves the required 80% level. This policy does create more work. However, it guarantees that each student demonstrates proficiency of the key concepts. Several mechanisms help to facilitate this process.

The first purely technical mechanism that makes this testing policy possible is the use of test generating software. Every test is made with the use of a test generator. This allows the department to produce four versions of every test. Therefore, when a student retakes a test it covers the same material, albeit with different questions, order, or numbers. A second invaluable mechanism is the availability of a tutoring and testing center or math lab. The math lab is open six days a week during the university's primary semesters. The math lab provides drop-in service for help with almost any mathematics topic. The lab has a room designated for testing only. Students take the placement test and instructor-based tests in this room. This testing room allows instructors to make tests and retests available to students at their convenience.

Because time is a given constraint for all classes, students must recognize the importance of passing tests at or above the 80% level on their first try. Currently the grading policy states that instructors will average the scores for every test to determine grades. Therefore, a student who scores 50% on the first test, then scores 90% on a retake of the same material would have a 70%

average for that material. This policy curbs the idea that the first attempt at a test does not matter. Different instructors use different techniques to encourage success. Some instructors require that a student has completed homework to a certain level of acceptability, others may give quizzes or pretests to ascertain readiness. Some instructors allow students to assess their own level of preparation, but stress the importance of achieving high levels of success. However, the main goal of the department is to encourage students to understand the mathematical concepts. Students who understand the concepts will pass tests at acceptable levels.

All of the developmental mathematics department's tests require students to show work that supports answers. Some questions require students to write a brief explanation. Instructors can ascertain how well students grasp concepts by observing an individual's work and reading brief explanations. Therefore, as instructors grade their own classes' tests, they determine a student's strengths or weaknesses. Departmental meetings help the developmental mathematics instructors to maintain consistent testing and grading policies despite individual differences. Meetings allow instructors to discuss opinions and techniques available for helping students to understand mathematical concepts. Full time employment of all developmental mathematics instructors makes this possible.

## Concept Emphasis

The emphasis on concepts and connections probably contributes to the program's success more than any other factor. Students who memorize algorithms and techniques often forget the appropriate use of each. They do not remember when, where, or why to use the various algorithms and often mix and match rules at will. By contrast, students who understand concepts face minimal amounts of memorization. Consider the analogy of a novice cook. If a new cook learns to memorize cooking processes and times, she may have difficulty cooking a new dish or following an unusual recipe. If, on the other hand, a new cook understands some basic concepts about preparing different foods, she or he can determine the basic cooking and timing processes without as much trouble. A master chef who thoroughly understands concepts of how different foods work together could develop his or her own recipe. Students who learn underlying numerical and mathematical concepts can also have an easier time of adapting to new situations and problems.

Mathematics instructors might recognize a student complaint like, "I have never before seen that type of problem." Complaints of this nature often occur shortly after the instructor demonstrates several problems of the precise nature that the student claims not to recognize. At times, the student's real difficulty is that the numbers are different and the student does not understand the numerical or mathematical concepts related to the problem. Consider the example of adding two fractions with different denominators. The student who memorizes the algorithms that the instructor uses in a particular example may have difficulty adding two fractions with different denominators. A student who understands fractions and the nature of the addition operation may, by contrast, recognize the need for common denominators without any examples from an instructor. Most developmental mathematics students will need examples

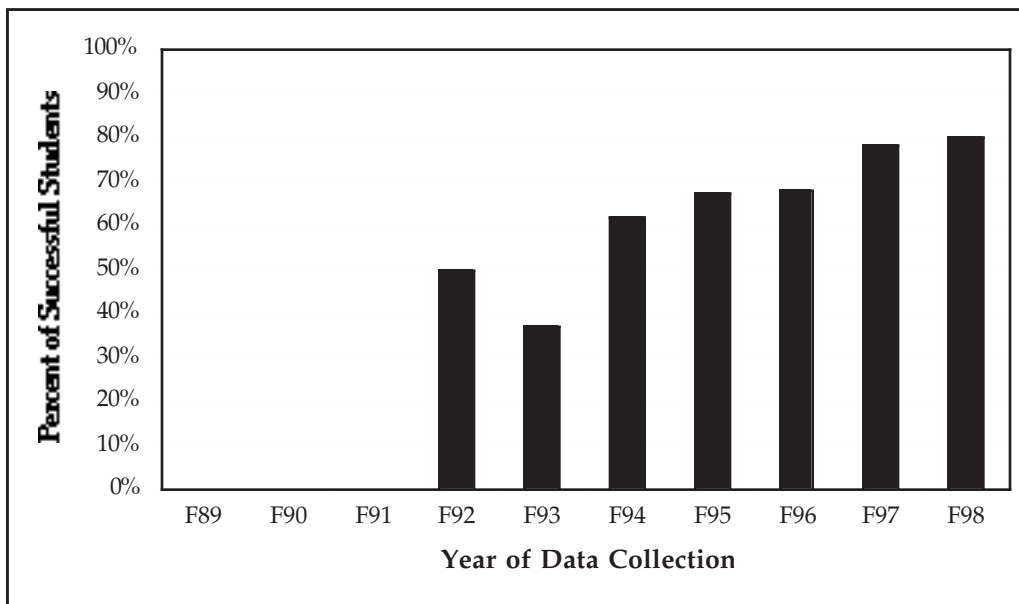
from instructors. However, students who understand concepts will follow a greater diversity of examples, and apply them to a greater variety of problems. Developmental students need to understand numerical concepts underlying our number system. They need to understand what numbers symbolize, the importance of place value, and the various number representations. Additionally, students need to note the distinction between numbers and operations with numbers. This emphasis on concepts helps students to successfully complete assignments, pass tests at acceptable levels, attain good grades in developmental courses, then go on to succeed in future mathematics courses.

## Results and Discussion

Many positive results arise from these placement policies, cooperative ideals, and conceptual teachings. A university source, independent of the developmental mathematics department, indicates that the most recent pass rate (successful completers, students receiving a C- or better) in developmental math courses is above 80%, as shown in Figure 2. The retention rate for the developmental mathematics classes is above 90%. Additionally, grades in subsequent mathematics classes (100-level) have risen as shown in Figure 3. The real proof of any developmental course comes from success in subsequent courses for which the developmental courses provide preparation. The statistics, students, and instructors for subsequent courses all indicate that this developmental math program is meeting its goals. A past study indicated that

Figure 2

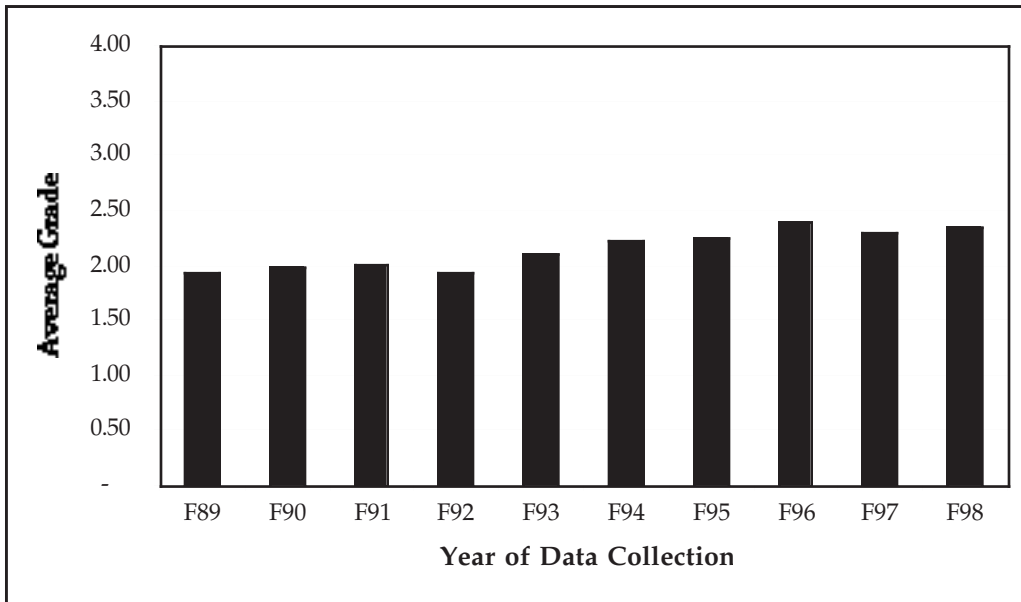
Successful Completers in Developmental Mathematics 1992-1998



at least 80% of the developmental mathematics students who took the subsequent mathematics course within a year of taking their last developmental mathematics course earned grades roughly equivalent to the grades earned in developmental mathematics. As previously indicated, mathematics faculty members tell us that they can depend on the prior developmental students to comprehend material and do well in their classes. However, the most gratifying results come from the many students who return to thank developmental mathematics instructors.

Figure 3

Average of the Grades of 100-level Mathematics Students 1992-1998



Recall that the pass rate refers to students who receive a C- or better in a developmental mathematics course. Students who earn a C- are often encouraged to retake a course, review material, or move to only a slightly higher level developmental mathematics course. The developmental mathematics instructors strive to ensure that students really understand concepts before moving out of the developmental courses. Occasionally instructors will give a student an extended amount of time to learn concepts rather than record a low grade that would let a student move on to the next course. A developmental mathematics grade below a C requires the student to repeat the course or pass the placement test at an appropriate level to continue on to the next mathematics course. Statistics indicate that once enforcement of placement guidelines throughout the mathematics department took effect, grades in the entry-level mathematics courses showed steady improvement. The retention rates within the developmental mathematics courses also help to contribute to the success of the program.

In truth, actual retention rates may be above 95%. Very few students drop once enrolled in a developmental mathematics course. However, some students need to repeat a course even though they may have made valiant efforts. Occasionally students face difficult home situations, medical problems, or other extenuating circumstances that limit the time that they can devote to the course. In these situations the instructor may suggest that a student drop the course to avoid an unwarranted punitive grade. A rough estimate suggests that more than half of the withdrawals during any particular semester are a result of instructor recommendations, following personal consultations with a student.

All of the factors discussed here contribute to the program's success. Placement policies have had a significant effect on the number of students taking developmental mathematics courses as well as the success of each individual in the program. Cooperation among the instructors is crucial to the integrity of the program. Nevertheless, commitment to the importance of emphasizing underlying mathematical concepts, more than any other factor, provides a focus to the program. One could say that the emphasis on mathematical concepts has driven the need for uniform departmental placement policies and cooperative operating procedures. Perhaps it is the desire to instill solid conceptual understanding that leads the developmental mathematics faculty to continue to seek ways to improve the program.

## **Problems and Solutions**

Most of the time this program works well. Mandatory placement and concept teaching require a great deal of work. An institution seeking to adopt or revise a program to incorporate similar policies should note and prepare for the work required to establish and maintain these policies.

### **Placement**

One full-time faculty member of the mathematics department receives release time to provide placement advice for students wishing to take 100-level mathematics courses. In addition, a designated faculty member within mathematics education helps to give students placement advice germane to that area of mathematics. Finally, all of the developmental mathematics instructors are hired as full-time employees who assist with developmental placement advice in addition to teaching developmental mathematics courses. Every mathematics instructor who teaches an entry-level course (entry-level courses include both developmental and 100-level courses) must understand how to check a student's proof of placement. One of the best mechanisms for ensuring a smooth start to the semester in the developmental courses is the requirement that students obtain permission in order to register for a developmental mathematics course.

Students must call the developmental mathematics department for permission to register before registering for any developmental mathematics course. All of the developmental mathematics instructors have the same phone number. Voice mail helps considerably. If the line is busy, students can leave a message for a specific instructor or for a placement request.

Instructors check the placement messages regularly to respond to students' requests. Often students request inappropriate courses. By speaking to each student before he or she registers for a course, the developmental program can avoid most registration problems. Therefore, at the beginning of a new semester, the developmental mathematics instructors have an assurance that most of the students in their classes have the correct course at the appropriate level.

### Testing

Developmental mathematics students must retake any test if they score below 80% (excluding the midterm and final). This does require more work for the instructors. As mentioned previously, a good test program that allows one to generate new tests over the same material helps to make this policy feasible. The other necessary element is the math lab, where students can walk in for free tutoring. Although the developmental mathematics instructors hold office hours and help students, they can not provide assistance to students at all times. The math lab gives students an alternative. Some students may understand a tutor's perspective on a problem or may simply find that the operating times of the lab fit their schedule more effectively. Furthermore, the testing room of the lab fills an essential need. If a student must retake a test to demonstrate that he or she now understands the material, it is crucial that the student can choose from flexible retake times and dates. The testing room of the math lab makes the retesting feature viable.

The developmental mathematics instructors quickly found that it was necessary to instill in students a desire to earn good scores on every test. Averaging the grades of all the tests helps students to take each test seriously. Some instructors require students to complete homework at a specified level of competence. Daily quizzes also encourage students to practice and understand mathematics concepts. Each instructor has her or his own method for encouraging students to learn, understand, and thereby earn acceptable scores. Students who score below the 80% level on any test must correct work that was missed on the test and give an explanation of the mathematical concept required for the work. Additionally, depending on the nature of a student's misconception(s), instructors may require further studying or tutoring for the student to master the necessary concepts. This extra work often convinces students of the importance of understanding all the concepts to initially pass tests at high levels.

### Grading

The grading policies currently in use evolved over a period of several years. As problems arose, developmental mathematics instructors suggested possible solutions. Solutions that worked were kept. Occasionally an instructor has difficulty determining the grade for an individual student. Usually instructors try to err on the side of safety: It is better for a student to repeat a course to achieve understanding rather than pass only to fail a future mathematics course.

Currently the university does not have a grading option that allows an instructor to indicate that a student has worked hard, and made progress, but not at a level to allow continuation. In

these circumstances, developmental mathematics instructors try to give a grade within the existing system that will allow a student to continue without receiving a punitive grade, such as a failing grade. Some situations may warrant that a student withdraws from the course. Some situations may allow a student to receive an incomplete grade. Each developmental mathematics program needs to work out grading options that maintain consistency with the existing college or university policies.

### **Continuation**

One problem that is difficult to address is the inappropriate sequencing decisions made by developmental mathematics students. Students who decide to take a three semester break to recover from a mathematics course often suffer from that decision. Some students decide to take an advanced mathematics course before completing the prerequisite. Placement requirements help alleviate some of these issues that arise from inappropriate decisions. However, the current placement policies do not require that students take courses in a timely fashion. All of the developmental mathematics instructors strongly encourage students to take the next required course during the sequential semester, but students may have other scheduling constraints that create conflicts. However, other than advice and encouragement, developmental instructors have not found a solution for inappropriate sequencing decisions. Some schools may allow proactive intervention or other measures, such as requiring the completion of core curriculum mathematics requirements by the end of the sophomore year, to ensure smooth continuation of mathematics education. At this university developmental mathematics faculty strive to educate academic advisors to provide appropriate advice. Then developmental mathematics instructors can reinforce and iterate that good advice.

### **Faculty Cooperation**

Cooperation is not always easy. Periodic discussions held informally and during monthly meetings provide a forum for resolving teaching and learning differences. The fact that all of the instructors are full time helps to make a cooperative atmosphere possible, as well as enabling to work closely with each other. The developmental mathematics instructors do not always agree on the most important concepts to cover, or on the most important concepts to test. Nevertheless, the instructors do agree on major issues. Sometimes, even in the best situations, it is necessary to agree to disagree, provided that the disagreements do not compromise students' opportunities to learn and comprehend mathematics.

## **Summary**

The needs of developmental students motivated organizers of this program to promote mathematical concepts and their connections within developmental mathematics courses. Developmental students have often described a number of mathematics courses that they barely passed. These students need to experience true success in mathematics. Success comes from understanding the mathematics concepts in challenging courses that promote achievement in

future mathematics endeavors. These may include subsequent mathematics courses, as well as other courses that utilize mathematics, in addition to mathematics in jobs and life experiences. A conceptual emphasis puts the developmental student first.

The departmental placement policies make a significant difference in the nature of the developmental mathematics classes. Before enforcement of uniform placement policies, more developmental students took the second developmental mathematics course, Introductory Algebra, because it was the course they wanted. After enforcement of uniform placement policies in 1994, more developmental students took the first developmental mathematics course, Mathematical Concepts, because it was the course they needed. Overall grades for the developmental mathematics program began a steady improvement once placement policies were in effect. Additionally, overall grades for the 100 level mathematics courses that follow developmental mathematics also began a steady improvement. Furthermore, the developmental mathematics program continually improved to an unprecedented 80% successful completion rate in 1998 (successful completion refers to students who received a C or better).

Cooperation among faculty members makes the placement policy and concept emphasis possible. Instructors do not need to agree on everything. Instructors do need to agree on major issues that affect a student's ability to learn and succeed in mathematics. The mathematics faculty members have widely differing opinions on educational matters, but do agree to the necessity of mandatory placement. Developmental mathematics instructors also agree to put students first by emphasizing mathematical concepts and connections. Students succeed in a program that emphasizes sound concepts, appropriate placement, and faculty cooperation.

# BOOK REVIEW

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*Martha Maxwell*

MM Associates

**Learning and Development:  
Making Connections to Enhance Teaching**

*Silverman, Sharon L., & Casazza, Martha (1999)*

*San Francisco: Jossey-Bass. (302 pp.). Sharon Silverman is the former Director of the Learning Center at Loyola University Chicago, and Martha E. Casazza developed and presently directs the Graduate Program in Developmental Education at National-Louis University, Chicago. She is also currently president of the National Association for Developmental Education.*

**A**t last, a book is available that focuses on those important concepts that constitute the soul of developmental education—the affective and emotional factors that enhance or impede students’ academic success. It will be a godsend to new teachers who are striving to understand today’s diverse college students and to find more effective ways to teach them.

The book’s chapters concern the self and identity, motivation, interactions with the environment, ways of knowing, learning styles and preferences, self-regulation and goal setting. The authors also include useful information about how cultural background affects educational performance and discuss current theories of intelligence.

The book is organized so the reader is immersed in the research, theory, and learning principles of each topic and is shown how these can be applied in practice. To start, the authors

introduce six brief case studies of students you will easily recognize from those you have met, such as the English as a Second Language (ESL) student who wants to pursue a college degree but gets only minimal support from her parents who are, at best, indifferent to her goals; or the woman who studies very hard but continues to get poor grades; or the man who has built a successful business but finds returning to college courses an overwhelming challenge. In other words, the case studies represent typical students who have frustrated us for many decades. Their stories are woven into each chapter as part of the application of basic principles, so you meet the same characters again and again.

Although the book does not directly address instructional methods, it provides a framework for assessing one's own teaching assumptions and techniques and deciding on how to adapt one's teaching in order to better reach students. Satisfying and easy to read because the authors smoothly integrate current research into principles derived from theory and practice, this book joins the list of "must owns" of the learning assistance professional. A few examples illustrate the benefits: the discussion of ways of helping the field-dependent student structure disorganized information so she can better understand and remember it; the reasons why students from cultures where silence is golden need more "wait time"; and the problem that a Latino student raised in a culture where collaboration and cooperation are rewarded and learning is considered "okay" has in being regarded as a good student by a U.S. teacher whose stereotype of a good student is one who has clear cut goals, and is serious, very hard working, and competitive.

The book is easy to follow because the major points are reinforced and applied, and the various sections are smoothly and seamlessly integrated. The authors do an excellent job of explaining the relationship between theory, research, and practice and making it easy to understand. It will help new instructors better understand and work more effectively with many of the students they find most frustrating. Experienced practitioners will gain new insights as they read the results of recent research that shows how affective concerns relate directly to achievement and how these principles can be adapted to their teaching. (I found the research update particularly helpful because it validated many of my experiences.)

The authors suggest reasonable approaches to applying findings and constructs. For example, they do not urge us to match our teaching preferences to the student's preferred learning style—something that would be impossible to do in a class anyway, but rather they suggest becoming better aware of our own teaching styles so that we can show students how to stretch their styles rather than trying to change them. In other words, they do not tell us to teach calculus to the kinesthetic learner through dance as some earlier writers seemed to imply.

Certainly this book will be an excellent text for a beginning course in developmental education, but it is equally valuable as a resource for new college teachers in any field who want to better understand their students. Treat yourself to a copy; you will enjoy it and learn much. Also order copies for your library and resource room so they will be available for your staff and graduate students. You will find the book an invaluable resource for inservice training programs, for faculty development, or just to share with interested faculty members and administrators.

# CALL FOR SUBMISSIONS

## 2002 NADE MONOGRAPH

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7. The second page should be an abstract of the manuscript, maximum 100 words.
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