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Exploring Alternatives to Remediation

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ABSTRACT: The article addresses issues related to the cost and time investment of providing remedial courses to college students and offers an overview of possible alternatives. Some criticisms of developmental education are examined and countered with evidence from research. Frequently employed current practices are outlined. More recent alternative approaches to course delivery and student support services are then reviewed, and their application to at-risk student needs is discussed. Recommendations for the actual implementation of alternatives are included.

Many developmental educators perceive that they and their work are the subject of increasingly strident attacks by legislators and policy makers. Actually, this perception is not entirely accurate. Of the many services provided by developmental educators, only remedial courses are the target of most criticism. Developmental educators might benefit, therefore, by continuing to challenge criticisms of remedial courses while also continuing their study and exploration of alternatives to them.

In doing this it is important to note that developmental education as a whole is not under attack. Most legislators and policy makers accept and support the need for tutoring, instructional laboratories, individualized learning programs, and learning centers in colleges and universities. Although developmental education may be conceived of as a continuum of such interventions, ranging from individual basic remedial courses at one end to comprehensive learning centers at the other end, most of the criticisms are directed at the lowest end of the continuum: to remedial courses. Students, parents, administrators, faculty, and legislators regularly complain that remedial courses take too long, cost too much, and keep students from making progress toward degrees by holding them in several different levels of noncredit, remedial courses.

In response to these criticisms it should be noted that both logical and research-based arguments can be brought to bear to counter each of them. The criticisms are often based on misconceptions rather than fact. For one thing, "too long" is a relative term. According to the National Center for Education Statistics (1996) the vast majority of students complete their remedial requirements within 1 year. For the many students who are unable to succeed in college without remediation, the only alternative to an entire year's worth of effort is never completing college at all. Given this alternative, a year spent taking a few remedial courses might represent a very sound investment of student time and money. For many students, participation in remedial courses does extend their time in college by as much as a semester to a full year. For most of these students, however, it is a case of "better late than never." It is better to delay graduation than to risk never receiving a degree at all and losing access to the employment and economic opportunities resulting from a college degree (Lavin & Hyllegard, 1996).

The criticism that remedial courses represent an unreasonable proportion of public higher education expenses is simply invalid. There is little evidence that eliminating remedial courses would result in any significant savings in state allocations for higher education. A recent report from the Brookings Institute (Breneman, 1998), for instance, points out that the total national expenditure for remedial courses in a given year is less than 1% of expenditures for public higher education in the United States. The report also suggests that the benefits of remedial courses greatly outweigh this minimal cost. A follow up to this report concludes that "remedial education draws political fire far in excess of any reasonable view

of its budgetary costs" (Breneman & Haarlow, 1998, p. 20).

Another criticism of remedial courses is that many students drop out before completing them. This is a criticism with some basis in fact. A recent review of developmental education in Texas colleges and universities found some relationship between student attrition and the length of time spent in remedial courses (Boylan, et al., 1996). However, such a study has not been undertaken for any other state. Nor has any national study been done on drop out rates of students who repeat remedial courses.

It does appear to be true that the greater the amount of remediation *required*, the more likely a student is to drop out (Adelman, 1998). In other words, students who are assessed as needing multiple levels of remedial courses in two or more subject areas are less likely to complete college than those who need remediation in only one area. Those who place in remedial courses in only one subject area, however, are as likely as anyone else to graduate.

Adelman (1998), notes that students who place in the lowest levels of two or more remedial courses have very weak potential for college success to begin with. This, however, is not an argument for eliminating all remedial courses, particularly since most of those who take them are eventually successful in college (McCabe & Day, 1998).

The previous discussion notwithstanding, there is at least a germ of truth to the claim that remedial courses may take too long or cost too much for some students. If a student can develop the skills essential to college success without semester-long remedial courses, then any unnecessary time spent in remedial courses is too long. Furthermore, if the student or the public has paid for any unnecessary remedial courses, then that cost is too much.

The key term here is *unnecessary*. For a great many students with weak academic backgrounds and low placement scores, the investment of time and money in remedial courses is necessary if they are to have any hope of succeeding in college. For them, immersion in a battery of remedial courses may represent the only intervention that offers a reasonable chance of success. However, for some portion of the students with low placement scores, there are other interventions available that might accomplish the objectives of remediation without requiring participation in a series of remedial courses. For such students, remediation through formal courses may really be unnecessary.

As noted at the outset, remedial courses are only one form of intervention along the continuum of interventions that comprise developmental education. Other forms of developmental education may accomplish the same purpose at a lower cost to the student and with a lesser investment of student time. This article explores alternatives to remedial courses and methods of organizing these alternatives in a manner that may reduce the amount of time required for the remediation of academic skills deficiencies. It should be noted that these alternatives are not necessarily cheaper than remedial courses and, because many of them are individualized, they may be even more labor intensive. They do, however, offer the advantage of being less time consuming for some students.

It should also be noted that these alternatives may only be applicable to a minority of the students who place into remedial courses. It is likely that the very weakest students with multiple skill deficiencies will still require the discipline of a structured course and the immersion in subject matter provided by a semester or more of remedial course work.

Nevertheless, developmental educators have a professional responsibility to insure that participation in extensive remedial courses is required of students only when necessary. To the extent that other, less

time consuming and more efficient alternatives are available, students who might profit from these should have access to them.

Alternatives to Remedial Courses

Traditional Approaches

Traditionally, developmental education has included such activities as remedial/ developmental courses, tutoring, learning laboratories, and various forms of individualized instruction. Although they have been widely criticized, remedial/developmental courses do work. Success in these courses has consistently been found to contribute to improved student academic performance as well as increased student persistence (Boylan, Bonham, Bliss, & Claxton, 1992; Cross, 1976; Donovan, 1975; Roueche & Roueche, 1993; Roueche & Snow, 1977).

Tutoring is one of the primary components of today's developmental education, and almost all colleges and universities provide some form of it (Maxwell, 1985). Furthermore, tutoring in the basic skill areas consistently has been found to contribute to student success in courses and improved retention at the institution (Boylan, Bliss, & Bonham, 1997; Donovan, 1975; Maxwell, 1985). This is particularly true when it is accompanied by strong tutor training (Boylan, Bliss, & Bonham, 1997; Casazza & Silverman, 1996).

Individualized learning laboratories and learning centers also represent traditional approaches to developmental education. When properly implemented, these approaches, too, have been demonstrated to make a positive contribution to student success (Boylan, Bliss, & Bonham, 1997; Casazza & Silverman, 1996; Cross, 1976; Maxwell, 1985).

Approaches such as those described have formed the basis of developmental education practice since the 1960s (Cross, 1976). They represent validated interventions with a history of success. They are used by developmental education practitioners because, when properly implemented, they contribute to the success of students who might not otherwise be able to succeed in college. Consequently, there is no reason to abandon them. However, the experience of the past 2 decades suggests that there are other alternatives available which, when combined with traditional developmental education, can improve the quality of practice even more, reduce the number of students taking remedial courses, and, perhaps, lead to even greater student success. At the same time, creative use of these alternatives might also reduce the amount of time students need to spend in remedial courses.

Alternative Approaches

In addition to traditional approaches, developmental educators and developmental programs currently provide a variety of more innovative alternatives. Examples of these alternatives include freshmen seminar/orientation courses (Upcraft, Gardner, & Associates, 1989), Supplemental Instruction (Martin & Arendale, 1994), paired or adjunct courses (Commander, Stratton, Callahan, & Smith, 1996), collaborative learning communities (Tinto, 1997), and critical thinking courses and programs (Chaffee, 1992).

It should, perhaps, be noted that use the term "innovative" as applied to these alternatives is not completely accurate. Many of these interventions have been available since the 1970s and many of them are already used by developmental educators. Their use, however, has been limited in developmental programs, particularly as an alternative to remedial courses.

Freshman seminars. As Dwyer (1989) points out, colleges and universities have provided orientation to incoming students through most of this century. At universities, this orientation has occupied a day or two prior to the start of classes and involved students learning about their institution, its rules, regulations, procedures, and traditions. At community colleges, such orientation is generally even more limited.

As college rules and regulations became more complex, as "*in loco parentis*" was abandoned by institutions, and as more nontraditional students entered American colleges and universities, this "one shot" approach to orientation became increasingly ineffective (Dwyer, 1989). The freshman seminar concept, pioneered by John Gardner at the University of South Carolina in the 1970s, provided a much more comprehensive approach to the orientation of first-year college students.

Instead of lasting only a few days, the freshman seminar spans an entire academic term. Instead of concentrating on rules and traditions, the freshman seminar actually explores issues in college life, the purposes of higher education, and the requirements and expectations of college attendance through the vehicle of a regular, credit-bearing, college course conceived as an integral part of the first-year experience (Upcraft, Gardner, & Associates, 1989).

The freshman seminar has proven to be a highly effective way of integrating students into the campus culture and contributing to increased retention (Fidler & Hunter, 1989; Gardner, 1998). Because developmental students are often first-generation college students and, therefore, among the least knowledgeable of college lore, rewards, and expectations, the freshman seminar would appear to be a particularly valuable and important experience for them (Gardner). Participation in the freshman seminar would also enable developmental students to learn more about college life and the institution and obtain college credit while taking remedial courses. Although participation in the freshman seminar does not reduce the amount of time required for remediation, it does facilitate the adjustment of nontraditional students to college and contribute to their retention (Fidler & Godwin, 1994).

Supplemental Instruction. Supplemental Instruction, also known by its abbreviation as SI, was originally developed in the early 1970s at the University of Missouri-Kansas City by Deanna Martin (1980). It was designed to help medical school students succeed in their more difficult courses but has since been successfully applied to a variety of other groups, including developmental students (Martin & Arendale, 1998).

In Supplemental Instruction, courses in which students typically have difficulty are designated as "high-risk" courses, generally one in which 30% or more of the students enrolled obtain grades of D or F (Commander, Stratton, Callahan, & Smith, 1996). Such courses are targeted for Supplemental Instruction support. A key philosophical component of SI, therefore, is that terms such as "difficult" or "high risk" are assigned to the course rather than the students.

The support provided in SI courses consists of small-group sessions in which students who have taken the course previously serve as small-group leaders. A leader is a fellow student who attends the course, takes notes, and then meets with groups of students to discuss techniques necessary for success in the course. The student leader acts as a coach for those taking the course, offering advice and encouragement on note taking, test taking, and other study skills and strategies. This is all accomplished in small-group sessions where students may also be given oral or written quizzes or take practice tests. Another version of SI, Video-Based Supplemental Instruction or VSI, combines traditional SI activities with video tapes of lectures as a further aid in small-group sessions (Martin & Arendale, 1998).

Supplemental Instruction has been found to be particularly effective with developmental students (Blanc, DeBuhr, & Martin, 1983; Commander, Stratton, Callahan, & Smith, 1996; Ramirez, 1997). For example, developmental students who participate in Supplemental Instruction during their early years in college are retained at far higher rates than those who do not participate (Ramirez, 1997). From this evidence, it appears likely that some of the students placed in remedial courses might be successful in regular curriculum courses supported by Supplemental Instruction.

Learning communities and collaborative learning. Following extensive research using data from the Cooperative Institutional Research Program, Astin (1993) found that membership in one or more college communities is a critical factor in student development as well as retention. A consequence of this is that more aggressive efforts may be needed to help students develop membership in communities. The concept of learning communities at the college level is an effort to respond to this need.

At the college level, learning communities are based on the assumption that the classroom is not only a community but the only *academic community* that many students, particularly commuters and community college students, are likely to encounter in their lives. Consequently, it is important to make greater use of the classroom as a place to involve students in the academic culture. In a learning community, the classroom not only becomes a place where teaching occurs but also becomes a community in which students learn to learn.

Learning communities link courses and groups of students so that "students encounter learning as a shared rather than isolated experience" (Tinto, 1997, p. 602). Typically, a learning community is arranged by having students enroll together as a cohort in several courses linked together by a common theme. The instructors of these courses then function as a team to insure that content in one course is related to content in the other courses and to help students make connections to that content. Students in the learning community also work collaboratively in small groups or teams to solve problems, study, or develop class projects.

Uri Treisman suggests that collaborative learning techniques are particularly important for those students who may be from nontraditional backgrounds. Results from his workshops indicate that collaborative learning contributes to greater mastery of the subject matter and higher course grades for such students (Garland, 1993). Tinto (1997) reports that the use of learning communities emphasizing collaborative learning have a positive impact on student attitudes toward learning. His research also suggests that learning communities and collaborative learning activities have a positive effect on the academic performance and persistence of developmental students (Tinto, 1998). The use of learning communities in regular curriculum courses, therefore, represents another possible alternative to remedial courses.

Paired courses. Paired courses are, to some degree, related to collaborative learning in that a cohort of students registers for the same two courses. In the paired course model, however, one course is designed to supplement the other course. Rather than engaging students in a series of courses with a common theme, paired courses use the content of one course as a focus for the application of skills taught in another course (Commander, Stratton, Callahan, & Smith, 1996). A reading and study strategies course, for instance, might be paired with a sociology course. The instructors of the two courses would then work together to insure that the content and rate of coverage of material are consistent between the two courses. The reading and study strategies course would use the content of the sociology course as a focus for the reading and study strategies being taught. In this way, the content of both courses becomes mutually supportive.

The use of paired courses might work well for students who read at somewhere near the level of the sociology text but who still need to develop their reading and study strategies or other academic skills. It might work well for students who require the discipline of a structured classroom setting in order to learn. Paired courses might also provide some of the benefits of a learning community by emphasizing collaboration and involvement in the learning experience.

Paired courses have been demonstrated to be a successful technique for enhancing the performance of developmental students. Developmental students participating in paired courses tend to show higher levels of performance and demonstrate greater satisfaction with their instructional experiences than similar students participating in traditional courses (Commander, Stratton, Callahan, & Smith, 1996; Wilcox, delMas, Stewart, Johnson, & Ghery, 1997).

This research suggests that, for some students, the pairing of a remedial course with a curriculum course may enhance learning. As such, thoughtful use of paired courses might reduce the amount of time spent in remediation while enabling underprepared students to earn credit in regular college courses.

Critical thinking instruction. The ability to think critically—to use logic, to analyze information, and to solve problems—is an essential component of success in college. Unfortunately, as Chaffee (1998) points out, students in general and developmental students in particular are rarely taught these skills. As a consequence, the inability to engage in critical thinking is a major cause for the failure of developmental students.

This problem has been addressed by developmental educators in two ways. One is the provision of a stand-alone course or workshop designed to teach critical thinking skills. The other is the integration of critical thinking skill development activities throughout an entire curriculum. Research suggests that the latter approach is the more effective of the two, particularly for the weakest students (Chaffee, 1992; Chaffee, 1998; Elder & Paul, 1994). The model used by John Chaffee at LaGuardia Community College is, perhaps, one of the best known methods of integrating critical thinking into the curriculum. It involves teaching students to:

- * solve challenging problems;
- * analyze complex issues and arrive at reasoned conclusions;
- * establish appropriate goals and design plans for action;
- * analyze complex bodies of information and make informed decisions;
- * communicate effectively through, speaking, discussing, and writing; and
- * critically evaluate the logic, relevance, and validity of information (Chaffee, 1997).

This is accomplished through a series of courses emphasizing these skills and linked to reading, writing, and communication content.

There is a substantial body of research indicating that the development of critical thinking skills contributes to the academic success of developmental students. Participation in programs designed to teach critical thinking skills has proven to enhance student reading and writing skills (Chaffee, 1992),

improve student attitudes toward learning (Harris & Eleser, 1997), and improve student ability to do research for class assignments (St. Clair, 1994/95). An emphasis on critical thinking at the early stages of developmental students' academic careers may enable them to gain more from early remedial courses and, therefore, reduce the amount of time spent in remediation.

Strategic learning. Another approach to improving student learning is found in the individual learning skills courses developed by Claire Weinstein at the University of Texas at Austin (Weinstein, Dierking, Husman, Roska, & Powdrill, 1998). These courses provide students with an awareness of the systems nature of strategic learning, the range of factors which influence learning, and the impact and interaction among these factors.

Unlike many other learning skills courses or programs with focus on specific learning strategies, the strategic learning approach provides students with a basis from which to manage a variety of strategy choices and evaluate the application and effectiveness of their choices. In the Weinstein model (Weinstein, personal correspondence, December 29, 1998), students receive instruction in both the theoretical underpinnings of strategic learning and the practical application of specific learning strategies.

Weinstein's course emphasizes four main components: (a) skill, or cognitive strategies and study skills; (b) will, or motivation and self-efficacy for learning; (c) self-regulation, or time management and comprehension monitoring; and (d) academic environment, or social support and the nature of the task. Based on these main points, students learn to strategically match their selection of learning strategies to task demands and their own learning goals; identify problems and potential problems in the application of these strategies; and generate alternative learning plans based on solution-relevant factors in the context of particular problems (Weinstein, Dierking, Husman, Roska, & Powdrill, 1998).

A major benefit of strategic learning instruction is that students are able to transfer the knowledge gained to other subjects and other courses. Furthermore, these benefits appear to last throughout students' college careers. As evidence of this, Weinstein points out that those who participate in the course are retained and graduate at rates higher than those of the general student population and even those who enter the course with low placement scores are retained and graduate at a rate of 71% (Weinstein, personal correspondence, December 29, 1998). Participation in the course also has contributed to the improvement of subsequent GPA for high-risk students (Weinstein, Dierking, Husman, Roska, & Powdrill, 1998).

Certainly developmental students could benefit from this sort of training. It may not only improve their capacity to succeed more rapidly in early remedial courses but also improve their likelihood of success in the regular curriculum.

Implementing Alternative Approaches

All of the interventions discussed here, both traditional and alternative, have been and can be provided through administrative agencies organized as developmental education programs or learning assistance centers. Typically, developmental education programs are organized around a collection of courses whereas learning assistance centers are organized around a battery of support services. Frequently, these services are provided outside of either developmental programs or learning assistance centers. They are sometimes provided by counseling centers, academic departments, or student affairs programs. Often, they are not even targeted for underprepared students; instead, they are offered to students in a particular course or program, to honors students, or to any students choosing to participate.

In essence, services that are frequently available to all students at an institution may be of particular benefit to developmental students.

Although many of these alternative approaches were not necessarily designed for developmental students, they have been shown to be effective for them and they have been widely adopted by developmental educators. A review of the most recent College Reading and Learning Association Conference program, for instance, indicates that 15 of 88 or 17% of concurrent sessions considered at least one of these innovative approaches. A review of the most recent program of the National Association for Developmental Education Conference indicates that 24 of 177 or 12.4% of concurrent sessions considered at least one of these approaches.

It is apparent that those who work with developmental students are well aware of alternatives to remedial courses. The problem is that they provide these alternatives randomly. Developmental educators do not offer these options nor do their students have access to them on a systematic basis. There are few, if any, institutions or programs in which:

- (a) a variety of alternatives to remedial courses are regularly provided,
- (b) developmental students have systematic access to them,
- (c) assessment and advising are used to insure that appropriate options are made available to meet the particular needs of individual students, and
- (d) all these features are organized in a systematic manner.

It is this failure to bring to bear the resources available to assist developmental students in a manner consistent with their individual characteristics and to do this in a systematic fashion for which most developmental programs may justly be criticized. We have the means to provide alternatives to remedial courses and to do so in a manner consistent with individual student needs. We simply have not organized and delivered the alternatives systematically.

Conclusion

Obviously, the key to the success of efforts to reduce the need for remedial courses is a systematic relationship between assessment, advising, and placement activities. Such a systematic approach requires a strong advising program based on information obtained from a combination of cognitive and affective assessment. It would probably require some retraining of academic advisors and counselors and would certainly require retraining of some faculty. This systematic approach would also require greater collaboration between developmental educators and those who provide Supplemental Instruction, freshmen seminars, critical thinking courses, and other interventions representing an alternative to remedial courses. If more developmental students are to take advantage of these alternative interventions, it might also require that more personnel and financial resources be assigned to these interventions, regardless of whether they were provided by the developmental program, the learning center, or through other campus agencies.

Using the alternative intervention techniques described here, it should be possible to reduce the amount of time students spend in remedial courses. These alternatives would not only reduce the amount of time students spend in remediation, they might also reduce the number of students enrolled in remedial courses. They would, however, require more training of advisors and faculty, more

collaboration among developmental educators and curriculum faculty, and, most likely, more resources than are currently assigned to developmental education.

This article has outlined a response to criticisms of remedial courses. It has described a variety of research-based alternatives to remedial courses. It has suggested that these alternatives be provided through a systematic integration of assessment, placement, and instruction designed to reduce the need for remedial courses on the campuses of American colleges and universities.

The interventions and approaches required to provide alternatives are not altogether innovative; most of them have been available for at least a decade or two. It is the systematic integration of these techniques with the assessment and advising process that represents a highly plausible alternative to traditional remedial courses. This alternative also represents, in the words of Pat Cross, a paradigm shift "Beyond education for all—Toward education for each" (Cross, 1976, p.3).

References

- Adelman, C. (1998). The kiss of death? An alternative view of college remediation. *National Crosstalk*, 6(3), 11.
- Astin, A. (1993). *What matters in college?* San Francisco: Jossey-Bass.
- Blanc, R.A., Debuhr, L.E., & Martin, D.C. (1983, January/February). Breaking the attrition cycle: The effect of Supplemental Instruction on undergraduate performance and attrition. *Journal of Higher Education*, 54, 80-90.
- Boylan, H.R. (1980). Academic intervention in developmental education. *Journal of Developmental Education*, 3(3), 10-11.
- Boylan, H., Abraham, A., Allen, B., Anderson, J., Bonham, B., Bliss, L., Morante, E., Ramirez, G., & Vadillo, M. (1996). *An evaluation of the Texas Academic Skills Program*. Austin, TX: Texas Higher Education Coordinating Board.
- Boylan, H. R., Bliss, L.B., & Bonham, B. S. (1997). Program components and their relationship to student performance. *Journal of Developmental Education*, 20(3), 2-8.
- Boylan, H.R., Bonham, B.S., Bliss, L.B., & Claxton, C.S. (1992, November). *The state of the art in developmental education: A report of a national study*. Paper presented at the First National Conference on Research in Developmental Education, Charlotte, NC.
- Breneman, D. W. (1998). Remediation in higher education: Its extent and cost. In *Brookings papers on Education Policy 1998* (pp. 359-383). Washington, DC: The Brookings Foundation.
- Breneman, D. W., & Haarlow, W. N. (1998). *Remediation in higher education*. Washington, DC: The Thomas B. Fordham Foundation.
- Casazza, M., & Silverman, S.L. (1996). *Learning assistance and developmental education: A guide for effective practice*. San Francisco: Jossey-Bass.
- Commander, N., Stratton, C., Callahan, C., & Smith B. (1996). A learning assistance model for expanding academic support. *Journal of Developmental Education*, 20(2), 8-16.

Chaffee, J. (1992). Critical thinking skills: The cornerstone of developmental education. *Journal of Developmental Education*, 15(3), 2-8, 39.

Chaffee, J. (1997). *Thinking critically 5/E*. Boston: Houghton-Mifflin.

Chaffee, J. (1998, January). *Critical thinking: The cornerstone of remedial education*. Paper presented at the Conference on Replacing Remediation in Higher Education, Stanford University, Palo Alto, CA.

Cross, K.P. (1976). *Accent on learning*. San Francisco: Jossey-Bass.

Donovan, R. (1975). *Alternatives to the revolving door* (Report of FIPSE National Project II). New York: Bronx Community College.

Dwyer, J. O. (1989). A historical look at the freshmen year experience. In L. Upcraft & J. Gardner (Eds.), *The freshmen year experience* (pp. 25-39). San Francisco: Jossey-Bass.

Elder, L., & Paul, R. (1994). Critical thinking: Why we must transform our teaching. *Journal of Developmental Education*, 18(1), 34-35.

Fidler, P. P., & Hunter, M. S. (1989). How seminars enhance student success. In L. Upcraft & J. Gardner (Eds.), *The freshmen year experience* (pp. 216-237). San Francisco: Jossey-Bass.

Fidler, P.P., & Godwin, M.A. (1994). Retaining African-American students through the freshman seminar. *Journal of Developmental Education*, 17(3), 34-40.

Gardner, J.N., & Jeweler, A.J. (1992). *Your college experience. Strategies for success*. Belmont, CA: Wadsworth Publishing Company.

Gardner, J. (1998, November). *The changing role of developmental educators in creating and maintaining cultures of success*. Keynote address at the College Reading and Learning Association Conference, Salt Lake City, UT.

Garland, M. (1993). The mathematics workshop model: An interview with Uri Treisman. *Journal of Developmental Education*, 16(3), 14-18, 20-22.

Harris, J., & Eleser, C. (1997). Developing critical thinking: Melding two imperatives. *Journal of Developmental Education*, 21(1), 12-19.

Knopf, L.K. (1996). Remedial education: An undergraduate student profile. *American Council of Education Research Briefs*, 6(8), 1-11.

Lavin, D. E., & Hyllegard, G. (1996). *Changing the odds: Open-admissions and the life chances of the disadvantaged*. New Haven, CT: Yale University Press.

Martin, D. (1980). Learning centers in professional schools. In K.V. Lauridsen (Ed.), *New directions for college learning assistance: Examining the scope of learning centers* (pp.69-79). San Francisco: Jossey-Bass.

Martin, D. C., & Arendale, D. R. (1994). *Supplemental instruction: Increasing achievement and retention. New directions in teaching and learning*. San Francisco: Jossey-Bass.

Martin, D. C., & Arendale, D. R. (1998, January). *Mainstreaming of developmental education: Supplemental instruction and video-based supplemental instruction*. Paper presented at the Conference on Replacing Remediation in Higher Education, Stanford University, Palo Alto, CA.

Maxwell, M. (1985). *Improving student learning skills* (2nd ed.). San Francisco: Jossey Bass

McCabe, R., & Day, P. (1998). *Developmental education: A twenty-first century social and economic imperative*. Mission Viejo, CA: League for Innovation in the Community College and The College Board.

National Center for Education Statistics. (1996). *The condition of education: 1996*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Ramirez, G. M. (1997). Supplemental Instruction: The long-term effect. *Journal of Developmental Education*, 21(1), 2-10.

Roueche, J., & Snow, G. (1977). *Overcoming learning problems*. San Francisco: Jossey-Bass.

Roueche, J. E., & Roueche, S. D. (1993). *Between a rock and a hard place: The at-risk student in the open door college*. Washington, DC: Community College Press.

St. Clair, L. (1994/95). Teaching students to think. Using library research and writing assignments to develop critical thinking. *Journal of College Reading and Learning*, 26(2), 65-74.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, 68(6), 599-623.

Tinto, V. (1998, January). *Learning communities and the reconstruction of remedial education in higher education*. Paper presented at the Conference on Replacing Remediation in Higher Education, Stanford University, Palo Alto, CA.

Upcraft, M.L., Gardner, J.N., & Associates. (1989). *The freshman year experience*. San Francisco: Jossey-Bass.

Weinstein, C.E., Dierking, D., Husman, J., Roska, L., & Powdrill, L. (1998). The impact of a course in strategic learning on the long-term retention of college students. In J. Higbee & P. Dwinell (Eds.), *Developmental education: Preparing successful college students* (pp.85-96). Columbia, SC: National Research Center for the First Year Experience and Students in Transition.

Wilcox, K.J., del Mas, R.C., Stewart, B., Johnson, A.B., & Ghere, D. (1997). The "package course experience and developmental education. *Journal of Developmental Education*, 20(3), 18-20, 22, 24, 26.

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