

Bridging the Evidence Gap in Developmental Education

By Michael L. Collins; Invited Contribution

Researchers are divided over whether or not developmental education helps academically underprepared students enter and be successful in college-credit courses.

ABSTRACT: *This article addresses conflicting perspectives regarding research in developmental education. Subsequent to examining opinions regarding the rigor of research in the field to date, recommendations for a research agenda are proposed. The study's review of research strengths and weaknesses suggests multiple types of evidence, potentially pointing college leaders and policymakers to better strategies and approaches.*

Nationally, nearly 60% of recent high school graduates who enroll in community college take at least one developmental education course to address gaps in their academic preparation (NELS, 1988). Community colleges offer a wide range of programs and services to students who are academically underprepared. In addition, state legislatures appropriate large sums of money to support colleges' efforts to improve student outcomes. But for all of the institutional efforts and money spent on programs and strategies to remedy students' academic deficiencies and improve their chances of completing college, success rates remain low. Placing into these courses has been shown to lower students' chances of successfully completing a degree (Attewell, Lavin, Domina, & Levey, 2006; Bailey, 2009).

Developmental education in community colleges is estimated to cost between \$1.61 billion and \$2.01 billion (Strong American Schools, 2008, p. 11). However, according to the National Education Longitudinal Data Survey of 1988 (NELS, 1988), fewer than 25% of community college students who took at least one developmental education course completed a degree within 8 years of enrollment. Forty percent of their "college-ready" counterparts completed college degrees within the same amount of time (Bailey, 2009). Such poor results for such great costs have fueled an ongoing debate as to whether or not developmental education is effective.

Researchers are divided over whether or not developmental education helps academically underprepared students enter and be successful in college-credit courses, transfer to 4-year institutions, earn credentials, complete degrees, and earn family-supporting wages in the workforce. Some note an acute shortage of quality research

on developmental education, citing lack of data and the use of questionable research methodologies (Bailey, 2009; Calcagno & Long, 2008; Grubb, 2001; Levin & Calcagno, 2007; Perin & Charron, 2006). Levin and Calcagno (2007) write, "There is in fact little definitive evidence on the effectiveness of remedial courses and practices on persistence to graduation, quality of performance in subsequent courses, and grade point average, and so on in the relevant literature" (p. 4). Simply put, this group of researchers points to the absence of experimental design, quantitative research studies linking specific interventions to improvements in outcomes for students who test into developmental education.

Other researchers appear less daunted by the dearth of evidence and report findings suggesting that some aspects of developmental education are effective. In *What Works: Research-Based Best Practices in Developmental Education*, Hunter Boylan, director of the National Center for Developmental Education, provides an inventory of "best practices." According to Boylan (2002), "Best practices refer to organizational, administrative, instructional, counseling, advising, and tutoring activities engaged in by highly successful developmental education programs. These programs are typically validated by the research and the literature in developmental education" (p. 3). One such institutional practice that Boylan's (2002) research has found to yield improved success rates is organizing developmental education programming *centrally* rather than dispersing it within specific academic departments. Similarly, In *Yes, We Can!*, Robert McCabe (2003) describes 16 steps for an effective developmental education program, which he asserts are based in research. According to McCabe (2003), "We know how to do it [effective developmental education]. We simply do not use what we know" (p. 24). These findings and assertions about the effectiveness of developmental education are in sharp contrast to the findings of the aforementioned quantitative researchers who are markedly less sanguine about developmental education's ability to improve success outcomes.

Given these conflicting interpretations, it is difficult for community college leaders to know which programs and strategies hold the most

Michael L. Collins
Program Director
Jobs for the Future
88 Broad St., 8th Floor
Boston, MA 02110
mcollins@jff.org

promise for improving the outcomes of academically underprepared students. Framing the research evidence in such stark terms—effective versus ineffective—does little to guide community college leaders to the most effective practices for serving the thousands of students currently enrolled in developmental education. It also does little to aid new students enrolling semester after semester whose assessment scores indicate that they lack the academic preparation necessary for college success. Oversimplified labels of effectiveness also do not help state policymakers allocate appropriations strategically and efficiently to drive community colleges toward implementing the programs and strategies that yield the greatest results.

In an era of fiscal strain and budget shortfalls, community college leaders and state policymakers must invest resources only in the programs, practices, and policies that help the most students complete their degrees. But it is difficult to identify the right investments in the face of opposing claims as to whether or not developmental education is effective in helping academically underprepared students succeed. Further, the dichotomous characterization of research evidence on developmental education obscures the complexity and nuance inherent in the evidence base, particularly limitations in the research that are ripe for further investigation potentially leading to new knowledge about what works.

This article describes the conflicting evidence and shows how it hinders community college leaders' and state policymakers' efforts to allocate resources toward strategies and approaches that make the most difference in improving outcomes. Rather than characterizing developmental education research as dichotomous—weak versus robust (implying good versus bad)—a closer examination of the evidence's strengths and weaknesses suggests that there are multiple types of evidence that can potentially point community college leaders and state policymakers to better strategies and approaches. This research features practitioners' observations elicited from surveys as well as the latest research featuring more rigorous statistical methods performed on more recently available data sets.

State Policy as a Lever to Identify Effective Programs and Practices

State policy can play an important role in bridging the gaps in evidence on the effectiveness of developmental education. No doubt this starts with policy development to reduce the need for developmental education by improving college readiness among high school graduates. But with regard to improving outcomes in developmental education, states can develop higher

education policies that are conducive to identifying and showcasing practices, programs, and strategies that show the most promise for increasing success rates and for being shared and implemented in other colleges across the state.

First and most important, states can establish data systems that identify important milestones of student progression through developmental education and track which students reach them. Second, states can establish college-readiness assessment policies that more clearly establish beginning proficiency levels for students who test into developmental education, such as the use of placement assessment scores. The use of common start points that are comparable, such as placement assessment scores, allows for “apples to apples” comparisons of student progression rates. This enables states to use powerful benchmarking strategies to identify and learn from the institutions that are getting the greatest results for students who test into developmental education. Third and finally, states can develop higher

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education policies that provide incentives and other supports for community college leaders, developmental education practitioners, researchers, and state policymakers. Such policies can be used to analyze student outcomes data on developmental education and draw conclusions from multiple types of evidence in an ongoing process of continuous improvement.

The continuous improvement approach is more appropriate than relying on academic research findings from specific programs. This approach takes into consideration that, in addition to programs, other institutional elements contribute to student success. Further, it is more in line with the practical realities that community college educators and state policymakers face while trying to make real-time decisions about the most effective strategies and approaches to implement and support.

The Evidence Base on Developmental Education

Although there is a great demand for evidence of effectiveness in developmental education—most evident in the ubiquitous demand for “best practices”—there is little systematic evaluation of programs and improvement strategies that vali-

date claims of effectiveness. According to Perin and Charron (2006), evidence on developmental education has typically come in four formats: (a) literature that highlights the weak evidence base on the effectiveness of developmental education, (b) a national study conducted in the 1990s, (c) single-institution studies, and (d) a small number of quantitative studies featuring rigorous statistical methods (p. 182). The authors go on to characterize the degree to which researchers are able to generalize their findings, which provides a helpful frame for examining the current state of the evidence of developmental education's effectiveness.

Perin and Charron's (2006) research categories can be essentially divided into two types: descriptive and experimental. Descriptive research includes data collection and analyses of surveys, interviews, and observations describing the effects of an intervention. Experimental research is designed for scientific studies (e.g., medical, physics), whereas qualitative methods are often applied in social sciences (e.g., sociology, education). In the developmental education literature, many studies focus on institutional practice. Some have found that certain developmental education programs and practices are effective (Boylan, 2002; McCabe, 2000; McCabe, 2003; Rouche & Rouche, 1999). Consequently, findings from these studies are often cited as “best practices” and are broadly circulated among developmental education practitioners (Boroch, Hope, Smith, Gabriner, Merry, Johnstone, & Asera, 2010).

Meanwhile, experimental research seeks to explain cause-and-effect relationships. Experimental research designs include the use of comparison groups and research methods that address selection bias. True experimental research designs use randomized trials. Quasiexperimental designs use similar statistical controls but do not use randomized trials. There is an extreme shortage of experimental research on developmental education. However, an evaluation of a learning communities program at Kingsborough Community College in Brooklyn, New York—one of four sites in MDRC's Opening Doors Project—is the most well-known example of a random assignment study in developmental education (Scrivener et al., 2008). The same shortage is true for quasiexperimental research, but there is a growing number of this type of study in the field. The evidence from experimental studies is mixed. Some have shown that developmental education has a moderately positive impact (Bettinger & Long, 2007), some have revealed little to no impact (Calcagno & Long, 2008), and still others have demonstrated a negative impact (Martorell & McFarlin, 2007).

These findings are confusing; one group of researchers has identified effective programs and practices whereas another has found little to

no evidence of effectiveness. What is the source of these conflicting claims?

Hierarchy of Research

The conflicting evidence on whether or not developmental education works can be partially attributed to researchers' methodology (Perin & Charron, 2006). All evidence is not considered equal in the academic research community. There is a hierarchy of evidence that influences the confidence with which researchers can make claims about their findings (Levin & Calcagno, 2007). Quantitative researchers by and large define this hierarchy wherein experimental research designs featuring random assignment are considered the most rigorous, followed by quasiexperimental and nonexperimental research designs; descriptive research is considered the least rigorous methodology.

In an experimental research design a random group of subjects (the *experimental group*) receives an intervention. Meanwhile, a second group of subjects (the *control group*) proceeds as they would normally with no special intervention. Researchers then measure whether or not the experimental group had different results than the control group. Because the subjects are randomly assigned from a matched pool to receive the intervention, differences in subjects' outcomes are attributed to whether or not they received the intervention. Random assignment studies in education are rare, primarily because of their complexity and cost (Grubb, 2001; Levin & Calcagno, 2007; Perin & Charron, 2006), but not nonexistent (i.e., Visher et al., 2008). Educators also point out a moral dilemma regarding withholding treatment from students who might benefit from it.

Quasiexperimental research studies are considered the next most rigorous type of evidence (Levin & Calcagno, 2007). Relatively recent improvements in states' longitudinal data have contributed to an increase in the use of regression-discontinuity, a type of quasiexperimental design that helps researchers better understand the impact of developmental education. Regression-discontinuity studies often rely on placement assessment cut scores. The cut score creates a dynamic wherein two relatively identical students—one just below the cut and one just above—serve as an experimental group and a control group. The student just below the cut score gets the intervention (some form of developmental education), and the student just above the cut score goes into college-level courses without an intervention. Researchers then control for student differences prior to the intervention so that comparisons of outcomes can be made for “similar” students. In other words, differences in results are attributed

to the intervention, which in this case is developmental education. These studies, the bulk of which are relatively new, have contributed important knowledge about developmental education's overall effectiveness toward increasing students' chances of completing credentials and degrees (Calcagno & Long, 2008; Martorell & McFarlin, 2007).

Nonexperimental research designs follow quasiexperimental designs in the quantitative research hierarchy of evidence. Nonexperimental research is often referred to as survey research or correlation research. It can be quantitative and show relationships. Descriptive research does not feature the use of comparison groups or statistical controls nor does it attempt to manipulate variables. Therefore, from a quantitative researcher's perspective, the lack of comparison groups, controls, and research methods for dealing with selection issues severely limits the ability to apply these findings more broadly

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(Bailey, 2009; Grubb, 2001; Levin & Calcagno, 2007; Perin & Charron, 2006). Given that the vast majority of the evidence suggesting developmental education's effectiveness is descriptive—and as a result situated at the bottom this hierarchy—it is easy to see one of the primary reasons why opposing claims exist on the effectiveness of developmental education.

The Practitioner versus The Quant: Unpacking Dual Claims on the Evidence

The disagreement on the effectiveness of developmental education unwittingly pits practitioner-oriented researchers against quantitative-oriented ones, each invalidating the others' claims. Practitioner-oriented researchers with strong ties to community colleges routinely cast evidence from descriptive research such as “best practices” that they believe institutions should implement in order to increase successful student outcomes. Quantitatively-oriented researchers either assert that there is weak evidence to support such claims or counter that such evidence actually suggests the very opposite: that developmental education has little to no effect on improving students' chances of college success. This bifurcated characterization of the evidence has created a situation wherein community college practitioners are advocating for and implementing one solution—for

example, mandatory placement for students who test into developmental education—and quantitative researchers are suggesting a different solution altogether, such as eliminating developmental education for students who test just below the placement cut score.

The hierarchy of the research evidence forwarded by quantitative researchers implies that only the most quantitatively rigorous research methods can reveal what is known about developmental education. Although that may be defensible from a statistical standpoint, it does not sufficiently acknowledge either the context in which community colleges and state policymakers operate or the several types of evidence that they can use to inform their decisions about which programs, strategies, and policies can make a difference.

It is unquestionably true that there is little evidence on the effectiveness of developmental education that meets the highest standards of quantitative researchers. But one may question whether or not these researchers—who spend little time in community college classrooms—are the appropriate arbiters of what should be considered “evidence.” Is it reasonable, for example, to categorically claim that descriptive research designs cannot reveal anything of value about effective practices? Nonexperimental and descriptive research designs are imperfect. But there are also limitations to even the most rigorous quantitative research methods. Given these limitations, it is important to look at what is considered evidence to account for the strengths and limitations of the different types of research. The limitations at each level of the hierarchy suggest that it is imprudent to reify the quantitative or the practitioner-oriented researchers' characterization of the evidence without considering the important elements that their respective research methodologies omit.

Factoring the Limitations of Research into a Strategy for Identifying Effective Practices

Few studies on developmental education have used systematic evaluation methods with rigorous statistical methodologies that allow the research findings to be applied broadly (Levin & Calcagno, 2007; O'Hear & MacDonald, 1995; Perin & Charron, 2006). This severely limits, if not eliminates, the ability to make definitive statements on the effectiveness of developmental education based on such research. Although the inability to generalize such findings is true from a statistical standpoint, it is impractical to conclude based on this logic that there are no effective programs and strategies in developmental education.

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Research limitations must be considered. Even with more rigorous statistical research designs, there is the possibility that extraneous factors might influence results. Characteristics like students' determination, grit, and resilience are difficult to measure, but they may influence student outcomes. Thus, it is important to understand what research does and does not do and to be mindful of limitations when interpreting the results of both experimental and nonexperimental research. Without this understanding, there is a risk of overlooking information that is critical for better understanding effective practices.

To illustrate the importance of understanding and factoring in the limitations of different types of research, consider the following: Research studies that do not control for student differences prior to a developmental education intervention risk attributing *all* successful results to the intervention. Sometimes the difference might be that the students being compared had different experiences before the intervention. For example, one student may have tested into developmental education because he or she did not take the placement test seriously, not because he or she lacked academic ability. Another student with the same assessment scores might have real academic deficiencies. If both students enroll in and complete a developmental education course, then attributing the success of the first student to the developmental education intervention would be not be accurate; that student's success may be a result of his or her preparation prior to the intervention. The risk here is a false positive—concluding that an intervention works when it actually is not a causal variable.

But the flip side of the coin is a false negative: concluding that an intervention does not work when it actually does. This can happen when interpreting the results of regression-discontinuity studies. These studies are considered to be statistically robust, but they are only relevant for students just below or just above the cut score (Bailey, 2009; Calcagno & Long, 2008; Levin & Calcagno, 2007). More importantly, they do not measure the degree of impact of specific institutional programs or practices. The findings in each regression-discontinuity study cited in this paper combine the results from developmental education interventions across multiple colleges within the data set being analyzed. This means that the effectiveness of developmental education programming—courses, services, counseling, financial aid, and other interventions which vary across institutions—is evaluated together. Regression-discontinuity studies have found that developmental education does not appreciably increase students' chances of success. But

because these types of studies measure results across all institutions in aggregate, it is possible that high-performing institutions implementing effective strategies may be lost in the averages. Here the risk is finding that developmental education does not work when, in individual instances, there may be strategies, programs, and practices that actually do work.

Causality at the Crux of Debate on Effectiveness

Much of the debate over the effectiveness of developmental education is about research methodology, particularly whether or not one can make causal inferences: "X occurred because of Y" (Levin & Calcagno, 2007). Attribution and precise specification of what variable caused a particular outcome is important in understanding the effect of a specific intervention, but there are limitations to experimental research methodologies.

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First, these types of studies only evaluate discrete interventions. If there were multiple practices involved in the intervention—for example, a paired course with tutoring, counseling, and advising components—random assignment studies generally are not able to identify which aspects of the program are responsible for the observed effects. Second, random assignment studies have very limited internal validity; they only tell whether or not a particular intervention was successful *as it was implemented* in the study. Third and finally, randomized trials take a long time to complete and are expensive to conduct. Given these limitations, it is necessary to draw on other types of evidence to identify effective practices for students who test into developmental education.

The hierarchy of evidence and its different types is useful as an academic map. But presenting each type of evidence as discrete—robust to weak—is less useful in helping community colleges and state policymakers know which models, practices, and approaches hold the most promise for improving outcomes (Perin & Charron, 2006). Furthermore, much of the evaluation (and hence the debate) on the effectiveness of developmental education is too narrowly focused on whether or not specific interventions are effective. This lens for evaluation, no matter how statistically focused, is less helpful in identifying the elements necessary for system-wide

and large-scale improvements in developmental education programming.

Moving Toward a More Practical Approach to Identifying Effective Practices

To better understand what is needed for broad-scale reform, a practical and cost-effective approach is needed that better reflects the context in which community colleges operate across states and is feasible for community colleges and state policymakers to implement given their restricted resources. As a practical matter, community colleges must consider multiple types of evidence. Success measures such as completion of developmental education requirements or gatekeeper courses, persistence, transfer, and graduation are all useful indicators of effectiveness.

Although it is extremely difficult to pinpoint the specific interventions that contribute to successful outcomes, longitudinal data analyses of both intermediate measures (e.g., completion rate for completing developmental education requirements) and final measures (e.g., transfer, earning a credential, completing an associate's degree) can illuminate whether or not outcome rates are moving in the desired direction. The outcome results on these measures are ripe for conducting multivariate analyses including quasiexperimental studies that can indicate effective practices. This approach, examining success outcomes in order to inform practice and policy decisions, is more closely associated with continuous quality improvement. Strong evidence from research done in K-12 suggests that this approach is more appropriate for identifying effective practices for large-scale improvement in education, and specifically developmental education (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010).

State Policy as a Lever to Identify Effective Practices

State policy is uniquely positioned to play an important role in identifying effective programs and practices, mainly by leveraging state-level data to promote continuous improvement and tying funding to such improvement. States can create policy conditions ideal for identifying and showcasing the programs, practices, and policies associated with the highest success rates for developmental education students. This continuous improvement approach is an alternative to the debate on whether or not particular developmental education programs are effective. Instead of focusing on the effects of particular programs, a state-level continuous improvement process can

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help identify the broader institutional characteristics that colleges need to focus on for systemic improvement. This wider lens looks beyond narrow programmatic interventions to address broader issues such as placement and assessment, curriculum, instructional delivery, academic and student services supports, and other factors that contribute to improved outcomes for students who place into developmental education.

Data-Driven Improvement

By collecting longitudinal data, states can gain a better understanding of which programs and practices work for students who place into developmental education. They can then develop success indicators specifically designed to measure students' progression through developmental education and on to college-level courses. By tracking student progress over time on both intermediate and final outcome measures that are disaggregated by socioeconomic status, race and ethnicity, enrollment status, and other important subgroups, states can identify which institutions are getting the best results with specific student populations so that their successful practices can be documented and broadly disseminated.

Incentives for Innovation

It is not enough to simply track outcomes. To accelerate the identification of effective practices, states can provide incentives for institutions to test and refine new models for serving students who test into developmental education. Texas is a leading example for this approach to identifying effective practices. The 81st Texas Legislature has appropriated \$5 million, distributed over 2 years, for developmental education innovation. Six colleges have received \$1.5 million for 2 years to comprehensively redesign their developmental education programming with an emphasis on accelerated delivery models.

Policy Supports

To further accelerate progress and create the conditions for broader implementation of successful approaches, states can remove the policy barriers that hinder innovative efforts. To identify what works, institutions will need to try new strategies and approaches that may not fit neatly within the confines of existing state policies, rules, and regulations. For instance, the vast majority of developmental education instruction takes place in courses that typically follow the traditional academic calendar. This hinders innovation because it reifies the traditional-length academic semester as an appropriate timeframe in which to master a developmental education course regardless of the level of students' remedial need or the rate at which they learn the

material. Therefore, students who only need parts of a particular course to refresh information they have forgotten are literally stuck in a full-semester course. This prolongs time to credentials and degrees—and invariably causes some to drop out. These types of barriers must be eliminated for innovative strategies to be implemented.

Finally, states can bring practitioners, researchers, and policymakers together through regularly scheduled meetings to share outcomes data, best practices, and strategies for accelerating successful student outcomes. This can encourage the use of multiple types of evidence—from experimental to descriptive—to inform the development of improvement strategies for students who enter college underprepared.

Conclusion

To better serve 21st century students it is imperative that practitioners, researchers, and policy makers work together to identify and implement

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programs and services which promote student success in college. Participation and input from all constituents should be elicited, evaluated for strengths and limitations, and applied appropriately. The paramount goal of promoting an educated citizenry is key to these essential efforts.

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college degree. Current leaders in the field are asking whether statistics could be considered the new standard for students not entering a STEM field. That decision could have significant effect on developmental mathematics curriculum without altering President Obama's goal for increased STEM numbers.

Emphasis has been given to acceleration programs. The opportunity to accelerate should be available to students, and some students will be able to do so; however it CANNOT be forced acceleration. Underprepared students will not always be able to "learn it faster!" The national trend, though, is to push students through the college curriculum as fast as possible. Some colleges are administering a placement test, giving students a workshop on similar test items, and then testing them again so they may place out of developmental education. Research is needed to see how such students fare without developmental education support. This type of research would require longitudinal data to measure success in subsequent credit courses.

Many other new initiatives are being discussed including the search for a quick fix for students who place into developmental education. These include better and multiple assessment tools with the possibility that students may not need a semester-long intervention. More precise assessment certainly has the potential to increase retention as well as student success, and that is a common goal worthy of continued pursuit.

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Maureen DuPont
ACTLA President 2008 - 2010
Math Lab Director
CSU San Marcos
San Marcos, CA
(760) 750-4122
mdupont@csusm.edu

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