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## Developmental College Education Courses and Programs: A Review of the Literature

Charletta H. Barringer-Brown  
*Virginia State University*

Patricia A. Lynch  
*Virginia State University*

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## Developmental College Education Courses and Programs: A Review of the Literature

### About the Author(s)

Corresponding Author:

Charletta H. Barringer-Brown, Ph.D., Ed.D., Professor, Director of General Education, Department of Political Science and Public Administration, Virginia State University, Petersburg, Virginia 23806. Phone: 804-524-5038, Email: [cbarringer-brown@vsu.edu](mailto:cbarringer-brown@vsu.edu)

Co Author:

Patricia A. Lynch, Ph.D., R.D., L.D.N., Associate Professor/Program Coordinator-Dietetics Department of Family and Consumer Sciences, Virginia State University, Petersburg, Virginia 23806. Phone: 804-524-5729, Email: [plynch@vsu.edu](mailto:plynch@vsu.edu)

### Keywords

Developmental, Remedial, community college, four-year college, education programs



## Developmental College Education Courses and Programs: A Review of the Literature

Charletta H. Barringer-Brown, Virginia State University  
Patricia A. Lynch, Virginia State University

### Abstract

This study reviews the current literature on best practices in developmental education concerning program structure and student placement procedures. Each academic year, millions of students decide to pursue post-secondary education. These students choose to pursue a college degree or the credentials necessary to improve their standard of living. It has been noted that many of these students are considered to be underprepared for college-level coursework and placed into developmental or remedial education. Among first-year undergraduates in the United States for the 2019-2020 academic year, approximately 40 percent reported enrolling in at least one developmental course. Among community college students, enrollment in developmental courses was significantly higher. The literature suggests that for these particular students, developmental education may offer both an opportunity for academic enrichment and may also serve as a barrier to the completion of college requirements. This literature review explains the prevalence and substantial costs of developmental education within the higher education system. It highlights evidence-based reform strategies that policymakers, states, and institutions may adopt to improve retention and graduation rates of remedial students' college completion.

Currently, individual colleges or universities have their own distinctive developmental education programs. The quality and the outcomes of these diverse programs significantly vary. There is no standardized or nationally-accepted construct used to evaluate these developmental programs. Although assessment and evaluation remain critical trends in higher education, it is critical to have adequate measures and metrics to monitor program and student progress. Additionally, ongoing program evaluation can enable continuous program improvement to maximize student outcomes. The review of literature provided supporting evidence for improving the outcomes of students in developmental education by providing substantiation of the following: 1) using multiple measures to assess post-secondary readiness and place students; 2) compressing or mainstreaming developmental education with course redesign, such as offering co-requisite college-level courses; and 3) implementing comprehensive, integrated, and long-lasting support programs.

### Introduction

The U.S. Department of Education (2016) has suggested that developmental or remedial education courses be designed to develop the skills of students who are underprepared for college-level reading, writing, and or math courses. According to a literature review, these areas of student academic deficiency are usually assessed through standardized tests. These non-credit developmental or remedial education skills enhancing courses are generally offered through community colleges and smaller private four-year colleges. The non-credit developmental or remedial education courses are offered to allow for open access to education to students who may otherwise be disadvantaged and or excluded from higher education due to academic

weaknesses. It has been asserted by Mokher, Park-Gaghan, and Hu (2021) that disproportionately, students of color, who are first-generation students and those from low-income backgrounds, tend to enroll in developmental education at two and four-year colleges. This enrollment in developmental courses has been significantly higher than their white peers. As discovered in the literature, students who may not have received adequate academic footing in high school and those who have been out of school for years may require a review of basic math or English skills. While colleges have offered developmental education courses and programs for several decades, state policymakers have started to direct attention to the increasing data that demonstrate the weaknesses of developmental education and the significant impact on the industry and workforce development, equity/diversity goals, and college completion. Developmental education college programs are essential because they create diverse opportunities for individuals to achieve educational growth. According to Bogle (2017), students can increase their intellectual and social development through direct participation in developmental education programs at the college level. As further asserted by Bogle (2017), in the United States (U.S.), many students acquire college degrees to attain better employment opportunities and higher wages/income. Developmental education is crucial for students who possess weak or poor academic skills because it plays a critical role in improving their outcomes. Students with poor academic skills or who do not complete their college degrees can expect to have occupations with lower pay, limiting their standard of living and contributing to a national educational concern. Almost thirty-four percent of undergraduate students receive their education from the community college system. Two-thirds of these student populations complete at least one developmental course.

Similarly, in four-year colleges (public and non-profit or private), almost fifty-five percent of the students pursue at least one developmental course. Developmental educational college programs are considered a significant investment for the students and their families. However, most students are underprepared for their college-level coursework (Ganga, Mazzariello, & Edgecombe, 2018; Department of Education, 2017). For these types of students, developmental or remedial educational programs can offer vast opportunities, such as academic enrichment and completion of college-level courses.

In this context, this study focused on demonstrating substantial and prevalent costs for the students to complete their developmental education in the higher education system. It also highlights evidence-based reform measures or strategies that must be adhered to by policymakers and institutions. Finally, it states to improve methods to ensure college-level course completion of their remedial students.

### **Review of the Literature**

This was a qualitative study, and a systematic review of literature on developmental and remedial education college programs was performed. The review protocol is registered and confines the PRISMA checklist for suitable reporting items in systematic reviews.

### **Search strategy**

The search strategy was a multiple-step process. First, the search terms "developmental college education programs" and "remedial college education programs, were applied to databases such as Embase, PubMed, CINAHL, and Web of Science to locate and access peer-reviewed studies relevant to the study. Next, multiple search terms were combined to form

phrases used to expand the search scope and retrieve additional data sources. Next, the search results' preliminary examination of texts and content in titles and abstracts was performed. The index words utilized to categorize the study allowed the final search phrases to develop. The search was performed in January 2022. The new phrases were entered into the databases and Boolean operators 'OR' and 'AND' helped locate relevant studies. Finally, the snowballing technique was applied to highlight other suitable studies in the reference lists of the retrieved studies.

The review of literature provided supporting evidence for improving the outcomes of students in developmental education by providing substantiation of the following: 1) using multiple measures to assess post-secondary readiness and place students; 2) compressing or mainstreaming developmental education with course redesign, such as offering co-requisite college-level courses; and 3) implementing comprehensive, integrated, and long-lasting support programs.

### **Screening and Appraisal**

The abstracts and titles were screened independently. In case of any doubts, the study remained on the list for examination by a third party. At the text screening stage, the expert reviewer in telemedicine implementation in rural areas reviewed texts for each study and gave feedback on the inclusion and exclusion criteria. All studies that met the inclusion criteria were considered for analysis. Data extraction was done systematically and guided by a pre-determined list of questions and variables. The data were recorded in a database created for this research. The process was tested on five articles and revised, and data on the following parameters were captured;

- The year of publication; author; the purpose of the article.
- Service details; community colleges; four-years colleges and universities
- Methodological approach; study design; source of data
- Recorded outcomes; costs; utilization of resources; facilitators of effectiveness; satisfaction, and process measures
- Other outcomes, including examples of evidence, identify variables that determine sustainability.

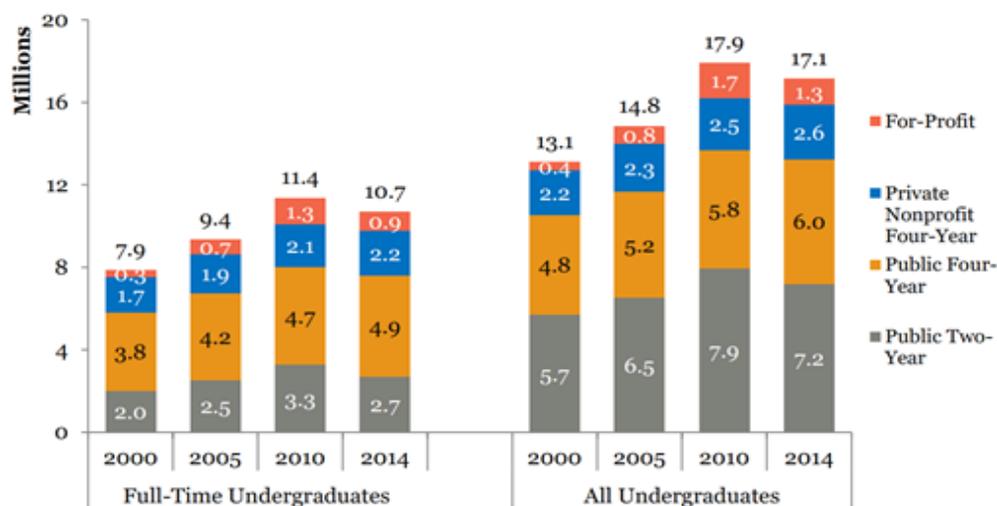
A second reviewer performed independent data extraction for a random selection of eight articles. The findings of the data extraction by both researchers were scrutinized for accuracy, consensus, and completeness. The shortcomings were resolved through mutual discussions. The level of evidence for each article was evaluated using the criteria set by Joanna Briggs Institute. The quality of each study was also examined utilizing an adjusted tool created for a systematic examination of the development and remedial education services in community colleges and four-year colleges and universities. The quality criteria were appropriate because they covered features relating to the services and methodology applied. Hence, the selected quality criteria were adequate for the objective of the analysis.

### **Enrollment of the Students in Developmental Courses**

Hartman (2018) stated that a million students are enrolled each year in the universities and colleges operating in the country. On being enrolled, students hope to acquire quality skills, training, and an educational degree, through which they seek to fulfill their dreams. However, Ganga, Mazzariello, and Edgecombe (2018) argued that there are students who do not seek to pursue developmental, educational college programs because of diverse reasons. Inaccurate

placement tests and enrollment of a mass of students into the developmental educational college programs are the two reasons for their opposing interests in pursuing the educational programs. A study result reported that three out of 10 students were placed in the English developmental courses. One-fifth of the Math developmental course students acquire a 'B grade and higher' in their college-level courses. Another reason is that the majority of the students fail to pass the placement tests for taking developmental education courses. Students who acquire lower scores during placement tests are further assigned to coursework for at least three semesters to become eligible for pursuing their college-level courses. In addition, students assigned to these three semesters of the development courses are less capable of being enrolled in the college-level courses, while the students assigned to lower developmental courses have higher chances of being enrolled in college-level courses (Ganga, Mazzariello, & Edgecombe, 2018). These findings indicate a need for reformation in educational program policies.

Hartman (2018) also explained that although most students need remedial educational college programs, only 40% of the students who enter community colleges are enrolled in one of the remedial courses. At the same time, only one student is expected to complete their degree in a remedial educational program out of four students. Therefore, developmental or remedial educational college programs are a significant barrier preventing students from completing their degrees. Ma and Baum (2016) reported that there had been an increase in the number of undergraduate students enrolling in the public sector institutions that provides two-year college-level course to achieve graduation degree among the different educational sectors. Similarly, there has been an increase in the enrollment of full-time undergraduate students in the public sector institutions that provide four-year college-level courses to achieve graduation degrees. Students are less likely to be enrolled in the private non-profit institutions that offer four-year-on-campus degrees because of their higher cost, i.e., \$47,831 (annually). Although easy access is given to the students by community colleges, completion rates remain stagnant because they are underprepared (Ma, & Baum, 2016). Thus, developmental courses become important before their enrollment in the institutions.

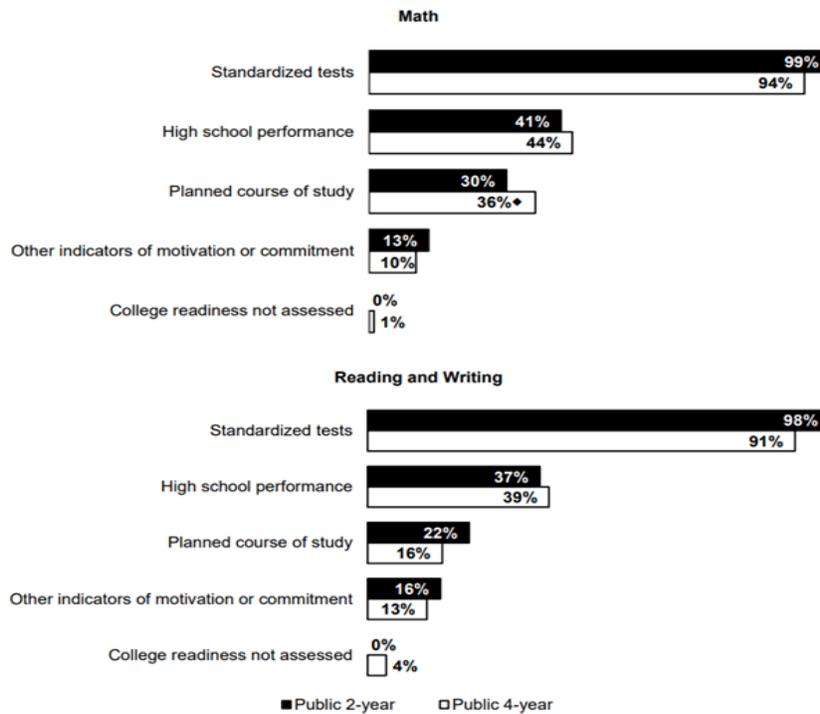


**Figure 1: Enrollment in Institutions that Grants Degree**  
 Source: (Ma, & Baum, 2016)

### **Importance of Placement of Students in Developmental Education**

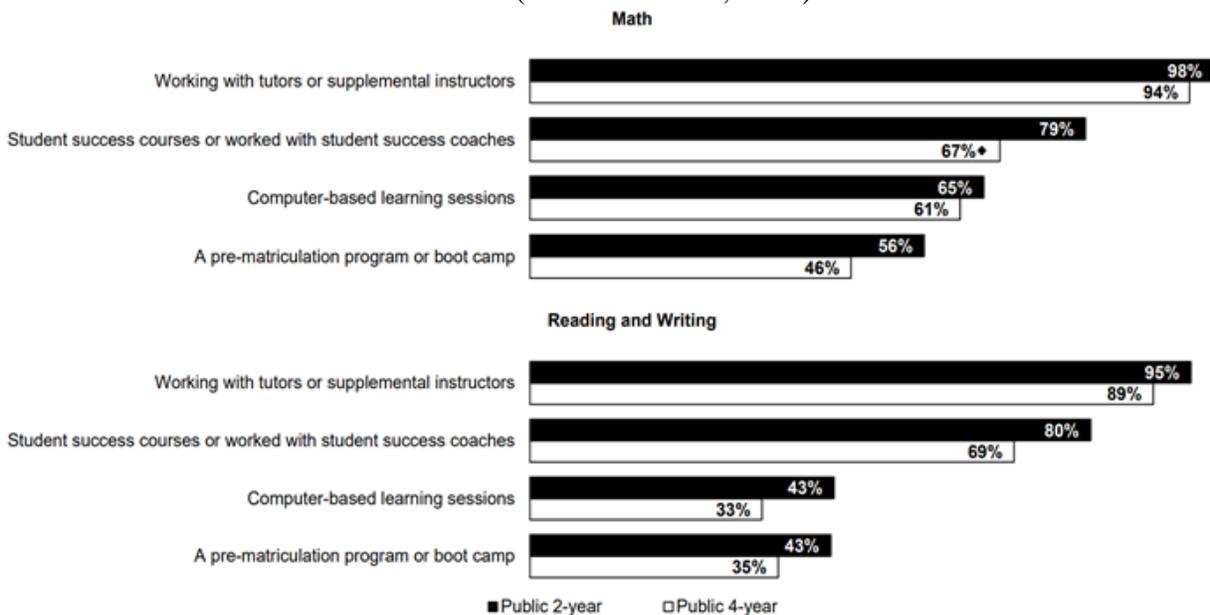
According to CCCSE (2016), the survey findings collected from the students (75,000+) from almost 150 institutions reported that the underprepared students of the community colleges had shown gratitude for being placed at a lower level of developmental English and math courses. Being placed at a lower level of developmental English and Math has created opportunities to learn each step effectively. The students have a strong record in their academic careers, but they have been disappointed considering the placement test results. Rutschow, Cormier, Dukes, and Zamora (2019) stated that traditional modes used by the colleges to provide developmental or remedial course education to the students during their college-level courses are ineffective in the true sense. It also imposes a significant barrier on the success rate of these students. To tackle this barrier, it is essential to bring reformation in the ongoing educational practices of the developmental courses. It has been identified that the states are making efforts towards bringing such reformations. Contextually, Rutschow et al. (2019) highlighted that "recent state policies mandating or recommending these reforms suggest that change is happening at a rapid pace, but few studies have looked at the scope and scale at which colleges may be implementing these changes on the ground" (p. iii). In figure 2, it is observed that before placement of the students for developmental courses (both reading and math), public colleges assess their college readiness, primarily through randomized tests. During the assessment, there is neither planning in the study course of the students nor any motivation by the colleges. These findings have been reported from the Center for the Analysis of Postsecondary Readiness (CAPR) survey results.

In figure 3, Rutschow et al. (2019) highlighted that across public colleges, the majority of the students are identified to be underprepared not only in 'math' but also in 'writing and reading.' Despite support services, such as assistance from supplemental instructors or tutors, coaches, sessions on computer-based learning, and pre-matriculation programs at the colleges, the placement rate of the students on either math or writing and reading developmental courses is observed to be low in public colleges across states. A policy analysis report also highlighted that educational policies play a significant role in influencing college practices in the three states, Georgia, Tennessee, and Texas. These findings report that although reforms are being executed rapidly across the colleges in different states, these reforms have been complex. To enhance the students' success rate and be placed in their preferred developmental courses, it becomes essential to incorporate integrated reforms that would provide financial support and assistance to the students to take their preferred courses. Even the colleges should understand the impact of reforms on the success-related factors of the student's placement. Herein, it had been highlighted in a report of MCCA (2021) that co-requisite remediation is an evidence-based practice for maximizing the placement success of the students that have completed English and Math courses in their first year. The co-requisite remediation has proven to be more effective than the factors of modularization and compression as well.



**Figure 2: Determination of 'College Readiness' in Public Colleges**

Source: (Rutschow et al., 2019)



**Figure 3: Determination of 'College Readiness' in Public Colleges**

Source: (Rutschow et al., 2019)

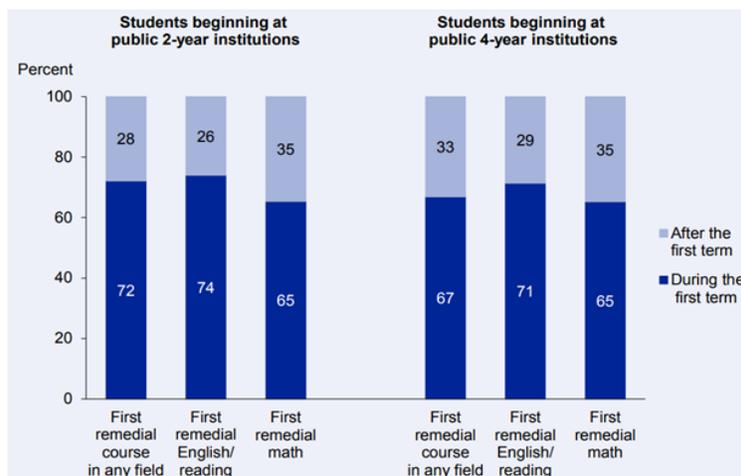
According to the U.S. Department of Education (2016), developmental education reform plays a crucial role in efforts to close racial and ethnic gaps in college graduation rates. Mokher, Park-Gaghan, and Hu (2021) assert that black and Hispanic students are disproportionately

assigned to developmental education. In addition, Baca (2019) discussed that black and Hispanic students who take developmental courses graduate at lower rates than white and Asian students who take developmental courses. These disproportionate factors compound attainment gaps among the different racial groups in the U.S.

In California, Baca (2019) stated that the implementation of 'California Assembly Bill 705' after its reformation in 2019 played a major role in maximizing the community college (Hispanic) students' placement success in taking the developmental courses. The college has achieved these positive reform outcomes because of the increased participation of the college staff, faculty, and the college administration. Since the barriers faced by these stakeholders play a key contributing role to the reduced placement rate of the students at their colleges, this reformation specifically addressed these barriers. However, McCann (2017) argued that the different holistic processes are often administered in community colleges. Considerably, it can be stated that Ivy Tech Community College in Indiana has adopted a system called Multiple Measures for Placement, in which the school assesses students' college readiness. Using a combination of measures (including grade point average and high school course-taking) to determine college readiness and, if necessary, the need for placement assessments" (McCann, 2017, p. 7). Students failing to meet the GPA (High school) along with transcript requirements to undergo placement may not need to be assessed for placement if they possess high or sufficient American College Testing (ACT) or Scholastic Assessment Test (SAT) scores. The only students that must take part in the placement exams (state) are the ones who do not meet these requirements (McCann, 2017). As there could be a diverse range of factors burdening the students, such as added coursework and additional costs, policy reformation becomes vital in determining a solution for the placement of these students.

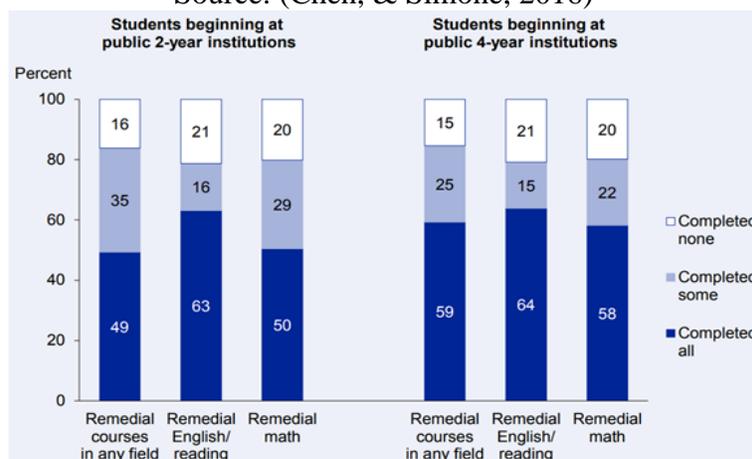
### **Completion of a Developmental Educational Courses and Degree Program**

Whitmire (2019) explained that in 2016, students being enrolled in college from high school increased from 63% to 70%. However, the main problem remains in the graduation course and degree completion, especially among the students with a low-income minority. Almost forty percent of the students who had not completed their four-year college requirements within six years were less likely to earn a degree. This also denotes that student (almost two million) beginning college every year is expected to drop out earlier than acquiring a diploma. Herein, Chen and Simone (2016) argued that in comparison with the course and degree completion rates in the U.S., developmental courses degree completion is considered to be better. In the below figure 4, the rate of students taking remedial courses in any subject (either English or Maths) during their first term in public institutions (2-year) is higher than the students taking developmental courses after their first term. It is also similar in the case of the public institutions (4-year). Besides, figure 5 illustrates that developmental course completion rates (especially in the English subject) of the students in public institutions (both 2-year and 4-year) are higher than the rate of students that complete some or do not complete the developmental courses in any of the subjects. McCann (2017) further stated that "at both two-year and four-year public institutions, students who do not complete all courses to progress to college work are less likely to attain a post-secondary degree. Even if they transfer to another institution, they do not complete their developmental courses or non-developmental students (p. 7). These figures suggested that acquiring developmental courses has played an essential role in the students' degree completion.



**Figure 4: Timing of Developmental Course-taking**

Source: (Chen, & Simone, 2016)



**Figure 5: Developmental Course Completion Rates**

Source: (Chen, & Simone, 2016)

**Developmental Education Costs and Non-Completion**

According to Jimenez, Sargrad, Morales, and Thompson (2016), costs for developmental education courses and non-completion of college programs are major investments. The U.S. Department of Education (2016) estimated that the collective cost to students and their families had been estimated at approximately \$1.3 billion per year. The total cost at all colleges in the U.S. combined has been estimated at approximately \$7 billion. The current literature reports that developmental programs appear to be a target for budget cuts and reforms directed to assist underprepared students in becoming more successful. These programs require substantial resources to provide the additional supports that they need. The experience of states that have implemented successful reforms does indicate that the need for developmental resources has shifted rather than declined. The 2013 to 2014 data recorded by the Complete College America and the U.S. Department of Education specifies that almost \$1.3 billion are spent annually in the District of Columbia and the other 50 states. The less populous states, such as Alaska, spend

approximately \$1 million compared to \$205 million in the more populous state of California on developmental courses. Nearly \$920 million was spent on developmental courses from 2014 to 2016 (McCann, 2017). Mokher, Park-Gaghan, and Hu (2021) reported that, on an annual basis, estimated developmental course costs for both institutions and students could reach up to \$7 billion. Despite higher costs, developmental education college programs (traditional) are considered ineffective mainly for the students who have less likelihood of passing the classes on the same subject in their college. As students pay a substantial amount of funds for tuition to get enrolled in these remedial courses, they are not provided with college credit for completing such courses. Over the past decade, the U.S. public institutions have been scrutinized for demanding higher costs, while the success rate of developmental education college programs (traditional) is low (Mokher et al., 2021). Thus, public institutions of higher learning need to be held accountable for such outcomes.

Mokher et al. (2021) argued that these concerns could be addressed by providing additional educational support services, such as academic tutoring and advising, based on the students' "out-of-pocket" fee. This additional educational assistance to the students could be possible through the reformation of the two-year community colleges and four-year colleges/universities across the U.S. Furthermore, the persistence rates of the colleges could also be improved by applying the efficiency model. Besides, it has been found that "Colleges tend to cross-subsidize the costs of more expensive upper-level courses with savings from less expensive entry-level courses" (p. 172). However, suppose more students persist in continuing the developmental education course programs in their preferred subject for a more extended period. In that case, the community colleges could be imposed under financial pressure because of the higher enrollment rate in the courses at the upper level. Since colleges cannot afford the implementation of reforms for a more extended period, these facts could be the major reasons for the ineffectiveness of the developmental education college programs. Thus, underprepared students through the developmental education college-level programs remain more significantly challenging for policymakers.

Furthermore, the U.S. Department of Education (2015) pointed out that, as the students pay a considerable amount, the colleges across the states fail to provide for the students' deserving needs. Thus, an effective change is required to support the students and the colleges, the federal government, accreditors, and the states (U.S. Department of Education, 2015). Therefore, an effective strategy for the reformation of educational practices must be constructed by considering the circumstances of colleges, states, the federal government, and accreditors, among others.

### **Strategies to Enforce Reformation**

#### **Multiple Measures for Assessing the Postsecondary Readiness and Student Placements**

Based on Whinnery and Odekar's (2021) findings, identified an assessment of post-secondary readiness of the students found that multiple measures must be conducted. These multiple measures include conducting examinations based on the local norms and standards, measuring the individual academic performance of their high school (GPA and coursework), and measuring the noncognitive factors, such as emotions, attitude, and motivational level of each student. Other measures could contribute to assessing the work experience of each of the students and their academic performance at college-level, such as their GPA and credit acquired from prior learning. Barnett (2020) elucidated that Traditional placement tests appear ineffective

in identifying capable students for enrollment in college-level courses (Barnett 2020). Therefore, multiple placement systems and assessment measures could be considered effective strategies. With the help of these strategies, the students' post-secondary readiness (PSR) could be identified and placed consequently. College-level course success of the students can be predicted better with the help of their GPA (high school). PSR will favor capturing the content knowledge and the student's competency. The CAPR survey data of 2015 also reported that the traditional method and the newly developed algorithm proved to effectively predict the student's success in college-level math and English courses. This method played a significant role in providing opportunities to the students to complete their college-level courses. Students were placed either by the traditional method, i.e., placement test, or the newly developed algorithm. These multiple measures provided students' college-level course achievement percentile as two-point nine percent higher than their first three semesters (Hamlin, & Denison-Furness, 2019; NSHE, 2019; Barnett et al., 2018). The post-secondary institutions could consider this effective strategy for assessing the post-secondary readiness of the students, thereby placing them effectively.

### **Early Assessment Programs with Cooperation from Secondary Schools**

Cardenas (2018) defined the Early Assessment Program (EAP) as a collaborative effort of three educational entities, namely California State University (CSU), California State Board of Education (SBE), and the California Department of Education (CDE). In determining the readiness of the post-secondary students for further placement, McCann (2017) suggested that the post-secondary institutions could incorporate the EAP program could. However, such institutions across the states must collaborate with the communities and the high schools to assess students at risk. These institutions could also engage the students during the early assessment stage and further execute college-readiness interventions when collaborating. This would play a key role in preventing the students from pursuing developmental courses in their preferred subject or field. Some states in the U.S. have implemented this program to assess students' readiness in their high school (junior year) and offer developmental courses to the underprepared students in the senior year. The help of the EAP program and collaboration with the local high schools allow the post-secondary institutions to inform the students, as well as their parents, concerning the need for the skill development in English and Maths subjects so that they could avoid placement in developmental education courses (SFSU, n.d.). Contextually, "an early assessment initiative between California Community Colleges and the California State University system, along with state-wide efforts in Kentucky, Tennessee, and Florida, provide opportunities for researchers to evaluate the extent of programs to help students accelerate towards taking college-level courses after high school" (McCann, 2017, p. 12). The post-secondary institutions could administer this strategy to ensure favorable educational outcomes for the students.

### **Mainstreaming or Compressing Developmental Education and Redesigning Coursework**

According to Bracco, Austin, Bugler, and Finkelstein (2015), mainstreaming developmental education by redesigning the college-level courses is one of the major strategies for meeting students' requirements for their preferred developmental courses. Another potential approach for redesigning the developmental course curriculum could be portrayed as compressing the sequences of the developmental course curriculum. Considerably, "for instance, where a student might previously have been designated as needing two semesters of

developmental English, a new course might be designed to fit that content into one semester, thus accelerating the student's path into credit-bearing courses" (Bracco et al., 2015, p. 3). Since the students are more likely to drop out if the exit points the students between their credit-bearing courses and enrollment in the developmental courses, accelerating the semester would minimize the probability of students exiting or dropping out. However, compressing developmental education and course redesign can still be a major challenge for college faculties. To address this concern, it becomes essential for the colleges to work closely with campus advisors, execute training (faculty-to-faculty), and design communication modes to reach students and their families. Herein, Boatman (2021) reported that with developmental courses, mainstreaming the students into their college-level courses and integrating the learning technology into the developmental course curriculum could help meet the student's academic needs. In addition, a study reported that the students who were exposed to the co-requisite and accelerated development courses (math) were identified to achieve positive outcomes when compared to their peers who were exposed to the traditional courses (Boatman, 2021; Jaggars, Hodara, Cho, & Xu, 2015). Thus, these findings depict that mainstreaming or compressing, and redesigning the developmental education course could maximize the student's academic success.

### **Co-Requisite Means of Promoting Educational Progress**

Whinnery and Odekar (2021) opined that co-requisite support or co-requisite remediation could be defined as the college-level course involving integrating additional support given to the students, such as educational support classes. Even a report by CCCSE (2016) highlighted that the co-requisite model significantly boosts confidence in the underprepared student's ability to overcome English college-level courses. Even underprepared students enrolled in community colleges perceive that co-requisite math helps to reinforce their educational learning. Miller, Daugherty, Martorell, and Gerber (2021) also highlighted that co-requisite pathways could significantly impact the students. It also clearly represented that co-requisite remediation helped maximize the probability of the students completing their first English course (college-level) within one year. The probability of the students was measured to improve by twenty-four percent in one year and 18% in two years. Alongside, Belfield, Jenkins, and Lahr (2016) also stated that co-requisite remediations have also played a major role in reducing student's fees for completing the developmental maths courses (college-level) by almost half of the fees that were previously charged by the colleges, i.e., from \$7,720 - \$3,840. A reduction observed in the student's fee for completing the developmental course in writing was estimated to be 11%, i.e., from \$3,750 - \$3,350. Daughtery, Gomez, and Carew (2018) discussed that five different co-requisite models could be reincorporated by the colleges, which entailed 'paired-course models,' 'accelerated learning program models,' 'technology-mediated support models,' 'academic support service models,' and 'extended instructional time models' (Logue, Douglas, & Watanabe-Rose, 2019; Schudde, & Keisler, 2019; Daughtery et al., 2018). These data reported that co-requisite remediation is an effective strategy that colleges must adopt across different states to create pathways for the students to progress through their educational coursework.

### **Integrated, Comprehensive, and Long-Lasting Educational Support Programs**

McCann (2017) specified that in bringing quality improvements in the educational outcomes of the students, institutions in different states have already incorporated integrated and comprehensive educational support programs. However, compared to the business practices, this

educational practice specifically emphasizes integrating participation with the students and the educational support services on a long-term basis. Scrivener, Weiss, Ratledge, Rudd, Sommo, and Fresques (2015) portrayed that the interventions comprising access to considerable resources for supporting students have shown the capability to deliver a positive impact on their transfer-out and graduation rates; despite attaining favorable rates, which are difficult for the students, especially in open-access institutions. For instance, a research study (experimental) reported that New York City University's Accelerated Study in Associate Programs (ASAP) almost doubled the graduation rate (three-year) of the students pursuing a developmental education course. At the same time, it also increased the transfer rate of the students to higher-level colleges, i.e., from three-year to four-year. However, Kezar and Holcombe (2018) argued a diverse range of evolved educational support programs for supporting underrepresented students in higher education. It also includes a comprehensive and integrated form of support programs that tend to be disconnected from their educational curriculum. Since these results focus only on one specific targeted need of the students, integrating co-curricular and multiple curricular supports could be an effective strategy for supporting the underrepresented students. One such educational program could be portrayed as the Colorado State University's (CSU) Science, Technology, Engineering, and Mathematics (STEM) Collaboratives (Kezar, & Holcombe, 2018). The institutions could also adopt this promising program to enhance the educational outcomes of the students while pursuing their college-level courses.

### **Conclusion**

Based on the research findings, we conclude that developmental or remedial educational college programs are vital for underprepared students to pave their pathways to complete their college-level courses and attain a degree. Although policymakers and institutions in the U.S. have been continuously putting efforts towards ensuring the students' college completion and improved educational outcomes, the findings specify that they must prioritize developmental or remedial educational college programs. Furthermore, it has been demonstrated that developmental education reform plays a strategic role in the ongoing efforts to reduce racial and ethnic gaps in graduation rates. This priority will help the students sharpen their educational skills and knowledge and build competency to meet the academic rigor for achievement. In addressing the compounding issues of these attainment gaps, stakeholders could integrate the identified evidence-based strategies to reform current academic practices and policies. These suggested strategies would possibly maximize the probability of students' success in their academic careers.

As seen in this research, one strategy that these stakeholders could adopt would be to train the students and make them self-regulated learners by effectively— (a) offering scholarship incentives to the quality performing students, (b) improving advising activities, and (c) incentivizing their continuous participation. Other strategies recommended for these stakeholders would be to implement multiple measures for assessing the student's post-secondary readiness and eligibility to undergo thorough placement tests and adopt integrated and comprehensive educational support programs in the long run. These strategies would benefit the students in achieving academic success with the assistance of developmental/supplemental courses and help the stakeholders address their challenges in supporting students' improvement educational outcomes.

## References

- Baca, A. M. (2019). "Now let us shift": A case study of developmental education reform in a Hispanic Serving Community College. *California State University - San Bernardino*, 1-264.
- Bailey, T., Bashford, J., Boatman, A., Squires, J., & Weiss, M. (2016). Strategies for post-secondary students in developmental education - A practice guide for college and university administrators, advisors, and faculty. *IES Practice Guide*, 1-116.
- Barnett, E. (2020). SUNY Colleges are using homegrown multiple measures systems to place students during the pandemic. Retrieved from <https://postsecondaryreadiness.org/suny-multiple-measures-pandemic/>
- Barnett, E., Bergman, P., Kopko, E. M., Reddy, V. T., Belfield, C., & Roy, S. (2018). Multiple measures placement using data analytics: An implementation and early impacts report. *Building Knowledge to Improve Social Policy*, 1-112.
- Belfield, C., Jenkins, P. D., & Lahr, H. E. (2016). Is co-requisite remediation cost-effective? Early findings from Tennessee. *Research Brief*, 1-12.
- Boatman, A. (2021). Accelerating college remediation: Examining the effects of math course redesign on student academic success. *The Journal of Higher Education*, 92(6), 927-960.
- Bogle, S. (2017). Top 10 reasons why college is important. Retrieved from <https://www.snhu.edu/about-us/newsroom/education/why-is-college-important>
- Bracco, K. R., Austin, K., Bugler, D., & Finkelstein, N. (2015). Reforming developmental education to better support students' post-secondary success in the common core era. *Policy Brief*, 1-8.
- Brickman, M. (2021). The missing element in education reform: State-based policies to improve post-secondary outcomes. Retrieved from <https://www.aei.org/research-products/report/the-missing-element-in-education-reform-state-based-policies-to-improve-postsecondary-outcomes/>
- Cardenas, C. (2018). The early assessment program: Helping high school students meet college expectations in mathematics and English. *A Joint Program of California State University and California Public Schools*, 1-2.
- CCCSE. (2016). Expectations meet reality: The underprepared student and community colleges. Retrieved from <https://www.ccsse.org/nr2016/>
- CCSSE. (2016). Expectations meet reality: The underprepared student and community colleges. *Austin, TX: The University of Texas at Austin, College of Education, Department of Educational Administration, Program in Higher Education Leadership*, 1-24.
- Chen, X., Simone, S. (2016). Remedial coursetaking at U.S. public 2-and 4-year institutions: scope, experiences, and outcomes. *Statistical Analysis Report*, 1-162.
- Clark, A. (2015). Developmental or remedial education. Retrieved from <https://www.newamerica.org/education-policy/topics/higher-education-access-and-affordability/college-transitions/developmental-or-remedial-education/>
- Daughtery, L., Gomez, C. J., & Carew, D. G. (2018). Designing and implementing co-requisite models of developmental education. *Findings From Texas Community Colleges*, 1-23.
- Dembicki, M. (2020). Strategies colleges used to increase enrollment this fall. Retrieved from <https://www.ccdaily.com/2020/10/strategies-colleges-used-to-increase-enrollment-this-fall/>

- Fishman, T., Ludgate, A., & Tutak, J. (2017). Improving outcomes in American higher education. Retrieved from <https://www2.deloitte.com/us/en/insights/industry/public-sector/improving-student-success-in-higher-education.html>
- Ganga, E., Mazzariello, A., & Edgecombe, N. (2018). Developmental education: An introduction for policymakers. *Education Commission of the States*, 1-12.
- Goss, P. (2016). Three schools reforms that will lift student outcomes. Retrieved from <https://theconversation.com/three-schools-reforms-that-will-lift-student-outcomes-61808>
- Hamlin, A., & Denison-Furness, J. (2019). Using multiple measures for placement at central Oregon community college. Central Oregon Community College, 1-2.
- Hartman, C. (2018). Developmental education: An overview of current issues and future directions. *Texas Education Review*, 6(1), 47-52.
- Jaggars, S. S., Hodara, M., Cho, S. W., & Xu, D. (2015). Three accelerated developmental education programs: Features, student outcomes, and implications. *Community College Review*, 43(1), 3-26.
- Jimenez, L., Sargrad, S., Morales, J., & Thompson, M. (2016). Remedial education: The cost of catching up. *Center for American Progress*, 1-22.
- Logue, A. W., Douglas, D., & Watanabe-Rose, M. (2019). Co-requisite mathematics remediation: Results over time and in different contexts. *Educational Evaluation and Policy Analysis*, 41(3), 294-315.
- Ma, J., & Baum, S. (2016). Trends in community colleges: Enrollment, prices, student debt, and completion. *College Board Research Brief*, 4, 1-23.
- MCCA. (2021). Michigan developmental education and placement recommendations. *Background & Context*, 1-10.
- McCann, C. (2017). Developmental education challenges and strategies for reform. *U.S. Department of Education*, 1-23.
- Miller, T., Daugherty, L., Martorell, P., & Gerber, R. (2021). Assessing the effect of co-requisite English instruction using a randomized controlled trial. *Journal of Research on Educational Effectiveness*, 1-25.
- Mokher, C. G., Park-Gaghan, T. J., & Hu, S. (2021). What happens to efficiency and equity? The cost implications of developmental education reform. *Research in Higher Education*, 62(2), 151-174.
- NSHE. (2019). Multiple measures: A better student assessment. *Assessing College Readiness Beyond High-Stakes Placement Tests*, 1-14.
- Rowan, B. (2021). *Implementing educational reform*. U.K.: Cambridge University Press.
- Rutschow, E. Z., Cormier, M. S., Dukes, D., & Zamora, D. E. C. (2019). The changing landscape of developmental education practices. *Findings from a National Survey and Interviews with Postsecondary Institutions*, 1-162.
- Schudde, L., & Keisler, K. (2019). The relationship between accelerated dev-ed coursework and early college milestones: Examining college momentum in a reformed mathematics pathway. *AERA Open*, 5(1), 1-22.
- Scrivener, S., Weiss, M. J., Ratledge, A., Rudd, T., Sommo, C., & Fresques, H. (2015). Doubling graduation rates: Three-year effects of CUNY's accelerated study in associate programs (ASAP) for developmental education students. *Building Knowledge to Improve Social Policy*, 1-129.
- SFSU. (n.d.). High school students. Retrieved from [https://gatorsmartstart.sfsu.edu/eap\\_students](https://gatorsmartstart.sfsu.edu/eap_students)

- U.S. Department of Education. (2015). Fact sheet: Focusing higher education on student success. Retrieved from <https://safesupportivelearning.ed.gov/resources/fact-sheet-focusing-higher-education-student-success>
- U.S. Department of Education, Remedial Coursetaking at U.S. Public 2- and 4-Year Institutions: Scope, Experience, and Outcomes, 2016; BPS 2009 via QuickStats.
- Whinnery, E., & Odekar, V. (2021). 50-state comparison: Developmental education policies. Retrieved from <https://www.ecs.org/50-state-comparison-developmental-education-policies/>
- Whitmire, R. (2019). Alarming statistics tell the story behind America's college completion crisis: Nearly a third of all college students still don't have a degree six years later. Retrieved from <https://www.the74million.org/article/alarming-statistics-tell-the-story-behind-americas-college-completion-crisis-nearly-a-third-of-all-college-student-still-dont-have-a-degree-six-years-later/>