What Works Clearinghouse™

ies INSTITUTE OF EDUCATION SCIENCES

Developmental Students in Postsecondary Education November 2014

Linked Learning Communities

Program Description[1]

Linked learning communities in postsecondary education[2] are programs defined by having social and curricular linkages that provide undergraduate students with intentional integration of the themes and concepts that they are learning.[3] *Linked learning communities* are based on the theory that active learning in a community-based setting can improve academic outcomes by increasing social as well as academic integration.[4] To that end, *linked learning communities* tend to incorporate two characteristics: a shared intellectual theme with a linked or integrated curriculum and a community or common cohort of learners.[5]

Research

The What Works Clearinghouse (WWC) identified six studies of *linked learning communities* in postsecondary education that both fall within the scope of the Developmental Students in Postsecondary Education topic area and meet WWC group design standards. All six studies meet WWC standards without reservations. Together, these studies included about 7,400 undergraduate students across six community colleges.

The WWC considers the extent of evidence for *linked learning communities* to be medium to large for four outcome domains—academic achievement, postsecondary enrollment, credit accumulation, and progress in developmental education. These outcomes were assessed in all six of the studies that met WWC group design standards. The WWC considers the extent of evidence for *linked learning communities* to be small for one outcome domain—degree attainment. (See the Effectiveness Summary on p. 6 for further description of all five domains.)

Effectiveness

Overall, the effects of *linked learning communities* on academic achievement, degree attainment, postsecondary enrollment, credit accumulation, and progress in developmental education for postsecondary students were neither statistically significant nor large enough to be considered to be substantively important. Therefore, the WWC considers *linked learning communities* to have no discernible effects on these outcomes for community college students in developmental education.

Report Contents

Table 1. Summary of findings[6]

Outcome domain	Rating of effectiveness	Improvement index *(percentile points)*		Number of studies	Number of students	Extent of evidence
		Average	Range			
Academic achievement	No discernible effects	+3	–1 to +4	2	2,241	Medium to large
Degree attainment	No discernible effects	+3	na	1	1,534	Small
Postsecondary enrollment	No discernible effects	+1	–1 to +4	6	7,419	Medium to large
Credit accumulation	No discernible effects	+1	–1 to +3	6	7,419	Medium to large
Progress in developmental education	No discernible effects	+1	–2 to +4	6	7,374	Medium to large

na = not applicable

Program Information

Background

There are many models of learning communities. Some of these are freshman seminars, team-taught courses, and residential-based learning communities.[7] These models draw in part from the residential college model utilized by Oxford University and Cambridge University in the United Kingdom. Learning communities were originally developed by researchers and academics interested in reforming the instructional methods used at large US universities. The interest in reforming postsecondary education was driven in part by two major factors: a) the perceived need to improve learning outcomes for postsecondary students, and b) the desire to increase the probability that students starting college will actually finish.[8]

This intervention report focuses on a specific approach to learning communities called the *linked learning communities* model.[9] In this model, cohorts of students enroll together in a foundational course (e.g., writing) and at least one additional content course (e.g., American history). The goal of this learning communities model is to improve student achievement through at least two mechanisms: a) shared curricular content (e.g., reading lists, assignments) across the courses, and b) co-registration with the same peer cohorts to provide social continuity within and between the linked courses. The idea is to give students the opportunity to apply the skills they learned in the foundational class to the content course's assignments (for example, writing an expository essay on Nathaniel Hawthorne involves practicing skills learned in developmental writing).

Program details

The *linked learning community* models that were implemented in the six studies in this report were highly similar to one another in many important respects. They all took place in community colleges during similar time frames. All of the learning communities involved (at least, in theory) linkages across one developmental course and one or two other courses, and occurred within a single semester. Therefore, they all investigated the most basic form of the *linked learning community* model and also met the minimum requirements for inclusion in this review.

The programs exhibited some variation across sites, including the specific nature of the sample, the focus of the developmental education experience (English or math), and the course to which the developmental education course was linked. In addition, the extent of curricular integration varied somewhat both across sites and over time.[10]

Cost

Visher et al. (2012) report on implementation costs across three studies included in this intervention report (no cost information is available for the other studies). Implementation costs varied dramatically across sites, ranging from a low of $211 per student to a high of $1,190 per student (expressed in 2011 dollars). The average cost across the three sites was $566 per student. About 43% of the implementation costs were attributed to additional instruction. Factors leading to additional instructional costs include compensation for the time needed for course planning and faculty collaboration, and smaller class sizes. Other cost categories were program support and student services (24%), which included case management and tutoring at some sites; administration (17%), which included a program coordinator and other administrative staff; and other services (16%), which varied across sites depending on the specific implementation parameters of the learning communities (e.g., one site provided students with vouchers for textbooks).

Visher et al. (2012) also explore the cost effectiveness of the *linked learning communities* model as implemented in the studies included in this intervention report, a discussion of which is beyond the scope of a WWC review. Interested readers are referred to Visher et al. (2012), pp. 67–76.

Research Summary

The WWC identified 22 studies that investigated the effects of *linked learning communities* on the enrollment and achievement of postsecondary students in developmental education.

Table 2. Scope of reviewed research

Grade	Postsecondary
Delivery method	Cohort
Program type	Practice

The WWC reviewed all 22 of those studies against group design evidence standards. Six studies, reported in four different manuscripts (Sommo, Mayer, Rudd, & Cullinan, 2012; Weiss, Visher, & Wathington, 2010; Weissman, Butcher, Schneider, Teres, Collado, Greenberg, & Welbeck, 2011; Weissman, Cullinan, Cerna, Safran, & Richman, 2012), are randomized controlled trials that meet WWC group design standards without reservations. These six studies are summarized in this report. Twelve studies do not meet WWC group design standards. Another four studies were determined not to meet WWC eligibility screens for review in this topic area. Citations for all 22 studies are in the References section, which begins on p. 10.

Summary of studies meeting WWC group design standards without reservations

Sommo et al. (2012) conducted a randomized controlled trial at Kingsborough Community College in Brooklyn, NY, with 1,534 students. During their first semester, 769 students were randomly assigned to participate in the Opening Doors Learning Communities program, which included an English course that was linked with two additional courses: an academic course required for the student's major and a one-credit freshman orientation course. Additionally, enhanced services (such as counseling/support services and textbook vouchers) were also available. The remaining 765 students were randomly assigned to the comparison group, who could not participate in the learning communities but did receive advice during the registration process from Opening Doors staff. Follow-up data were collected for up to 6 years after randomization.

Weiss et al. (2010) conducted a randomized controlled trial at Hillsborough Community College in Tampa Bay, FL, with 1,071 students. The intervention group included 709 students who were randomly assigned to participate in the learning communities during their first semester at the college. The learning communities linked a College Success course with either College Preparatory Reading 1 or College Preparatory Reading 2, depending on how the student was placed. The comparison group included 362 students who did not participate in the learning communities program. They were required to enroll in the College Success course, but they did not have to enroll during their first semesters. Follow-up data were collected for the first two semesters after the program.

Weissman et al. (2011) conducted a randomized controlled trial with 1,273 students at Houston Community College in Houston, TX. The intervention group included 761 students randomly assigned to participate in the learning communities that were designed for students at the lowest level of developmental math offered by the college: Fundamentals of Mathematics 1 (Math 1). Math 1 was linked with College and Career Planning, a student success course. The comparison group included 512 students who did not participate in the learning communities. Students in the comparison group were advised that they were required to take a developmental math course as a prerequisite to college-level math, but they were not mandated to do so. All first-year developmental students at the college were required to take the College and Career Planning course, including students in the comparison group, but for comparison group students, this course was not intentionally linked to the developmental math course. College staff assisted students in both the intervention and comparison groups with registration for all their courses. Follow-up data were collected for one semester postprogram.

Weissman et al. (2011) also conducted a randomized controlled trial at Queensborough Community College in Queens, NY, with 1,034 students. There were 608 students randomly assigned to the intervention group. The learning communities at Queensborough linked two levels of developmental math (Basic Mathematics and Problem Solving and Elementary Algebra) to either developmental English or college-level English. The study was expanded

after the first semester so that the developmental math courses were linked to various other college-level courses (such as business and sociology). The comparison group consisted of 426 randomly assigned students who did not participate in the learning communities. Students in the comparison group were advised that they were required to take a developmental math course as a prerequisite to college-level math, but they were not mandated to do so. College staff assisted students in both the intervention and comparison groups with registration for all their courses. Follow-up data were collected for two semesters postprogram.

Weissman et al. (2012) conducted a randomized controlled trial at the Community College of Baltimore County (CCBC) in Maryland with 1,083 students. The intervention group included 650 students who were randomly assigned to participate in the learning communities. The CCBC learning communities were organized around a developmental English course (either reading or writing). Students in the intervention group co-enrolled in the developmental English course, a college-level content course, and a master learner session. The comparison group included 433 students who could not participate in the learning communities. Students in the comparison group enrolled in a credit-bearing student success course that was mandatory for all developmental reading students and was similar to the master learner session taken by students in the intervention group. The follow-up data were collected for the first semester after the program.

Weissman et al. (2012) also conducted a randomized controlled trial at Merced College in California's Central Valley with 1,424 students, 711 of whom were randomly assigned to the intervention group. Most of these students enrolled in a developmental writing course that was linked to (a) another developmental course in reading or math, (b) a college success course, or (c) an introductory college-level course (such as criminology or music), but one learning community linked developmental reading with a student success course. The comparison group included 713 students who did not participate in a learning community. Follow-up data were collected for the first semester after the program.

Summary of studies meeting WWC group design standards with reservations

No studies of *linked learning communities* met WWC group design standards with reservations.

Effectiveness Summary

The WWC review of *linked learning communities* for the Developmental Students in Postsecondary Education topic area includes student outcomes in five domains: academic achievement, degree attainment, postsecondary enrollment, credit accumulation, and progress in developmental education. The six studies of *linked learning communities* that meet WWC group design standards reported findings in all five domains. The findings below present the authors' estimates and WWC-calculated estimates of the size and statistical significance of the effects of *linked learning communities* on postsecondary students in developmental education. For a more detailed description of the rating of effectiveness and extent of evidence criteria, see the WWC Rating Criteria on p. 34.

Summary of effectiveness for the academic achievement domain

Two studies reported findings in the academic achievement domain.

Sommo et al. (2012) reported the proportion of students with an overall grade point average of at least a C. Intervention group students were more likely to have an overall average of at least a C than were comparison group students (64% versus 59%). This effect was marginally statistically significant ($p < .10$), but it was not large enough to be considered substantively important.

Weiss et al. (2010) reported no statistically significant difference in the proportion of students with an overall grade point average of at least a C either in the program semester (73% versus 72%) or in the first semester postprogram (65% versus 66%). Neither of these observed effect sizes was large enough to be considered substantively important.

Thus, for the academic achievement domain, neither of the studies that met WWC group design standards showed either a statistically significant effect or an effect large enough to be considered substantively important. This results in a rating of no discernible effects, with a medium to large extent of evidence.

Table 1. Rating of effectiveness and extent of evidence for the academic achievement domain

Rating of effectiveness	Criteria met
No discernible effects *None of the studies show a statistically significant or substantively important effect, either positive or negative.*	In the two studies that reported findings, the estimated impact of the intervention on outcomes in the *academic achievement* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Medium to large	Two studies that included about 2,300 students in two community colleges reported evidence of effectiveness in the *academic achievement* domain.

Summary of effectiveness for the degree attainment domain

One study reported findings in the degree attainment domain.

Sommo et al. (2012) assessed the proportion of students who had attained a degree within 6 years after random assignment. Though a higher percentage of intervention group students had earned a degree (36% versus 31%), this difference was only marginally statistically significant ($p < .10$), and it was not large enough to be considered substantively important.

Thus, for the degree attainment domain, the one study that met WWC group design standards showed neither a statistically significant effect nor an effect large enough to be considered substantively important. This results in a rating of no discernible effects, with a small extent of evidence.

Table 2. Rating of effectiveness and extent of evidence for the degree attainment domain

Rating of effectiveness	Criteria met
No discernible effects *None of the studies show a statistically significant or substantively important effect, either positive or negative.*	In the one study that reported findings, the estimated impact of the intervention on outcomes in the *degree attainment* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Small	One study that included about 1,500 students in one community college reported evidence of effectiveness in the *degree attainment* domain.

Summary of effectiveness for the postsecondary enrollment domain

Six studies reported findings in the postsecondary enrollment domain.

Sommo et al. (2012) found no statistically significant difference in the extent to which intervention and comparison group students enrolled in college (87% versus 85%) or in the extent to which the students registered for courses (93% versus 91%). These differences are not large enough to be considered substantively important.

Weiss et al. (2010) found no statistically significant differences in the proportion of students in the intervention and comparison groups registered for classes during the program semester (82% versus 83%), and this effect is not large enough to be considered substantively important. Women registered for courses at about the same rate irrespective of their condition (85% versus 84%), but men registered for courses at a lower rate in the intervention group (78%) than in the comparison group (83%). This difference in registration rates between men and women in the intervention group is not statistically significant, but is large enough to be considered substantively important. See Appendix D.1 for more details.

Weissman et al. (2011) [Houston] found no statistically significant differences in the proportion of students in the intervention and comparison groups registered for classes during the program semester (84% versus 81%); this effect is not large enough to be considered substantively important. These authors did observe a statistically significant interaction between student gender and learning communities on registration rates. Women in the intervention condition registered at a higher rate (88%) than women in the comparison condition (80%), while men in the intervention condition registered at a lower rate (78%) than men in the comparison condition (84%). This difference in registration rates between men and women in the intervention group is large enough to be considered substantively important. See Appendix D.1 for more details.

Weissman et al. (2011) [Queensborough] found a marginally statistically significant difference in the proportion of students in the intervention and comparison groups registered for classes during the program semester (92% versus 88%, $p < .10$). However, this difference is not large enough to be considered substantively important.

Weissman et al. (2012) [Baltimore] found no statistically significant differences in the proportion of students in the intervention and comparison groups registered for classes during the program semester (85% versus 84%). This difference was not large enough to be considered substantively important.

Weissman et al. (2012) [Merced] found no statistically significant differences in the proportion of students in the intervention and comparison groups registered for classes during the program semester (73% versus 74%). This difference was not large enough to be considered substantively important.

Thus, for the postsecondary enrollment domain, none of the six studies that met WWC group design standards showed either a statistically significant effect or an effect large enough to be considered substantively important. This results in a rating of no discernible effects, with a medium to large extent of evidence.

Table 3. Rating of effectiveness and extent of evidence for the postsecondary enrollment domain

Rating of effectiveness	Criteria met
No discernible effects *None of the studies show a statistically significant or substantively important effect, either positive or negative.*	In the six studies that reported findings, the estimated impact of the intervention on outcomes in the *postsecondary enrollment* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Medium to large	Six studies that included about 7,400 students in six community colleges reported evidence of effectiveness in the *postsecondary enrollment domain*.

Summary of effectiveness for the credit accumulation domain

Six studies reported findings in the credit accumulation domain.

Sommo et al. (2012) reported on the number of regular credits that students had accumulated within two semesters postprogram. Although the intervention group had accumulated more credits on average (27.7 credits versus 26.2 credits), this difference was not statistically significant, and was not large enough to be considered substantively important.

Weiss et al. (2010) found no statistically significant difference in credit accumulation between intervention and comparison students after the first semester postprogram (5.3 credits versus 4.9 credits), and the effect size is not large enough to be considered substantively important.

Weissman et al. (2011) [Houston] found no difference in credit accumulation between intervention and comparison students after the second postprogram semester (4.7 credits in both groups).

Weissman et al. (2011) [Queensborough] found no statistically significant difference in credit accumulation between intervention and comparison students after the second postprogram semester (12.4 credits versus 11.8 credits), and the effect size is not large enough to be considered substantively important.

Weissman et al. (2012) [Baltimore] found no statistically significant difference in credit accumulation between intervention and comparison students after the first semester postprogram (5.9 credits versus 6.0 credits), and the effect size is not large enough to be considered substantively important.

Weissman et al. (2012) [Merced] found no statistically significant difference in credit accumulation between intervention and comparison students after the first semester postprogram (4.9 credits versus 5.1 credits), and the effect size is not large enough to be considered substantively important.

Thus, for the credit accumulation domain, none of the six studies that met WWC group design standards showed either a statistically significant effect or an effect large enough to be considered substantively important. This results in a rating of no discernible effects, with a medium to large extent of evidence.

Table 4. Rating of effectiveness and extent of evidence for the credit accumulation domain

Rating of effectiveness	Criteria met
No discernible effects *None of the studies show a statistically significant or substantively important effect, either positive or negative.*	In the six studies that reported findings, the estimated impact of the intervention on outcomes in the *credit accumulation* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Medium to large	Six studies that included about 7,400 students in six community colleges reported evidence of effectiveness in the *credit accumulation* domain.

Summary of effectiveness for the progress in developmental education domain

Six studies reported findings in the progress in developmental education domain.

Sommo et al. (2012) assessed whether students had passed both of their required developmental English assessment tests by the end of the second semester after the program. Although the intervention group did so at a higher rate (65% versus 60%), this effect was only marginally statistically significant ($p < .10$) and was not large enough to be considered substantively important.

Weiss et al. (2010) reported no statistically significant difference in the proportion of students completing College Prep Reading (1 or 2) during the program semester (60% versus 59%); this effect is not large enough to be considered substantively important.

Weissman et al. (2011) [Houston] reported no statistically significant difference in the proportion of students passing the second of two required developmental math courses within two semesters postprogram (18% versus 16%); this effect is not large enough to be considered substantively important. The study authors did observe a statistically significant interaction between student gender and learning communities condition on progress through developmental education. Men passed the second of two required developmental math courses within two semesters at about the same rate regardless of condition (about 16% in both the intervention group and the comparison group). However, about 19% of women in the intervention group passed both courses, whereas 15% of women in the comparison group passed both courses. Even though this interaction is statistically significant, the difference in pass rates between men and women in the intervention group is not large enough to be considered substantively important. See Appendix D.2 for more details.

Weissman et al. (2011) [Queensborough] reported no difference in the proportion of students in the intervention and comparison groups passing college math by the end of the second semester postprogram (10% in both groups).

Weissman et al. (2012) [Baltimore] reported no statistically significant difference in the proportion of students in the intervention and comparison groups passing college composition by the end of the first semester postprogram (27% versus 30%). This effect size is not large enough to be considered substantively important.

Weissman et al. (2012) [Merced] reported no statistically significant difference in the proportion of students in the intervention and comparison groups passing college composition by the end of the first semester postprogram (5.0% versus 5.1%). This effect size is not large enough to be considered substantively important.

Thus, for the progress in developmental education domain, none of the six studies that met WWC group design standards showed either a statistically significant effect or an effect large enough to be considered substantively important. This results in a rating of no discernible effects, with a medium to large extent of evidence.

Table 5. Rating of effectiveness and extent of evidence for the progress in developmental education domain

Rating of effectiveness	Criteria met
No discernible effects *None of the studies show a statistically significant or substantively important effect, either positive or negative.*	In the six studies that reported findings, the estimated impact of the intervention on outcomes in the *progress in developmental education* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Medium to large	Six studies that included about 7,400 students in six community colleges reported evidence of effectiveness in the *progress in developmental education* domain.

References

Studies that meet WWC group design standards without reservations

Sommo, C., Mayer, A. K., Rudd, T., & Cullinan, D. (2012). *Commencement day: Six-year effects of a freshman learning community program at Kingsborough Community College*. New York: MDRC. Retrieved from http://www.mdrc.org

Additional sources:

Bloom, D., & Sommo, C. (2005). *Building learning communities. Early results from the Opening Doors demonstration at Kingsborough Community College.* New York: MDRC. http://files.eric.ed.gov/fulltext/ED485506.pdf.

Scrivener, S., Bloom, D., LeBlanc, A., Paxson, C., Rouse, C. E., & Sommo, C. (2008). *A good start: Two-year effects of a freshmen learning community program at Kingsborough Community College*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED500477.pdf.

Weiss, M. J., Visher, M. G., & Wathington, M. (2010). *Learning communities for students in developmental reading: An impact study at Hillsborough Community College*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED510961.pdf.

Weissman, E., Butcher, K. F., Schneider, E., Teres, J., Collado, H., Greenberg, D., & Welbeck, R. (2011). *Learning communities for students in developmental math: Impact studies at Queensborough and Houston Community Colleges.* New York: National Center for Postsecondary Research. http://files.eric.ed.gov/fulltext/ED516646.pdf.

Weissman, E., Cullinan, D., Cerna, O., Safran, S., & Richman, P. (2012). *Learning communities for students in developmental English: Impact studies at Merced College and the Community College of Baltimore County*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED529251.pdf.

Studies that meet WWC group design standards with reservations

None.

Studies that do not meet WWC group design standards

Arcario, P., Clark, J. E., & Klages, M. (2007). Developing core skills in the major. In M. Smith & B. Williams (Eds.), *Learning communities and student affairs: Partnering for powerful learning; Learning communities and educational reform*. Olympia, WA: Washington Center for Improving the Quality of Undergraduate Education at Evergreen State College. Retrieved from http://www.evergreen.edu The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Bandyopadhyay, P. (2010). *The impact of course delivery systems on student achievement and sense of community: A comparison of learning community versus standalone classroom settings in an open-enrollment inner city public community college* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3390450) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Barnes, R. A., & Piland, W. E. (2010). Impact of learning communities in developmental English on community college student retention and persistence. *Journal of College Student Retention: Research, Theory and Practice, 12(*1), 7–24. The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Edgecombe, N., Jaggars, S. S., Baker, E. D., & Bailey, T. (2013). *Acceleration through a holistic support model: An implementation and outcomes analysis of FastStart@CCD*. New York: Columbia University, Teachers College, Community College Research Center. http://files.eric.ed.gov/fulltext/ED539910.pdf. The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Engstrom, C., & Tinto, V. (2008). Learning better together: The impact of learning communities on the persistence of low-income students. *Opportunity Matters: A Journal of Research Informing Educational Opportunity Practice and Programs, 1*(1), 5–21. The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Henriques, D. I. (2011). *Testing the efficacy of learning communities for underprepared first-semester college students* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3443426) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

McIntosh, J. G. (2012). *The impact of curricular learning communities on furthering the engagement and persistence of academically underprepared students at community colleges* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3509985) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Moore, L. H. (2000). *A mixed-method approach to evaluating learning communities for underprepared community college students: The integrated studies communties at Parkland College* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 9971142) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Spencer, K. M. (2012). *A study of the impact of a first-year experience initiative on first-year developmental education student success and persistence* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3542047) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Tharp, T. J. (2009). *Learning communities for university students at risk of school failure: Can they make a difference?* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3389640) The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Tinto, V., & Russo, P. (1994). Coordinated studies programs: Their effect on student involvement at a community college. *Community College Review, 22*(2), 16–25. The study does not meet WWC group design standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

VonHandorf, T. A. (2012). *Exploring the impact of learning communities at a community college: An effort to support students enrolled in a developmental math course* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3504070) The study does not meet WWC group design standards because it does not allow for an estimate of the intervention's effect isolated from other factors.

Studies that are ineligible for review using the Developmental Students in Postsecondary Education Evidence Review Protocol

Ashley, W. J. (2012). *The efficacy of learning communities in assisting developmental students in achieving graduation and accumulation of credit hours in a southern metropolitan community college* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3522188) The study is ineligible for review because it examines an intervention implemented in a way that does not fall within the scope of the review—the intervention is not a linked learning community as defined in this review (the learning community did not involve a specific linkage to another course).

Green, M. L. (2006). *A community college's response to serving underprepared, nontraditional welfare-to-work students* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3224155)

The study is ineligible for review because it does not examine an intervention implemented in a way that falls within the scope of the review—the intervention is not a linked learning community as defined in this review (the study was an evaluation of the New Visions program, which is a Welfare-to-Work program).

Massie-Burrell, T. (2010). *A learning community project: Comparative interventions on writing apprehension and locus of control of developmental students at a two-year college* (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 3443426) The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.

Visher, M. G., & Teres, J. (2011). *Breaking new ground: An impact study of career-focused learning communities at Kingsborough Community College*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED522631.pdf. The study is ineligible for review because it does not use a sample aligned with the protocol—the students are not in developmental education.

Appendix A.1: Research details for Sommo et al. (2012)

Sommo, C., Mayer, A. K., Rudd, T., & Cullinan, D. (2012). *Commencement day: Six-year effects of a freshman learning community program at Kingsborough Community College*. New York: MDRC. Retrieved from http://www.mdrc.org

Table A1. Summary of findings

Meets WWC group design standards without reservations

Outcome domain	Sample size	Study findings	
		Average improvement index *(percentile points)*	Statistically significant
Academic achievement	1,409 students	+4	No
Degree attainment	1,534 students	+3	No
Postsecondary enrollment	1,534 students	+2	No
Credit accumulation	1,534 students	+3	No
Progress in developmental education	1,534 students	+4	No

Setting

The study took place at Kingsborough Community College, a large, urban community college in Brooklyn, NY, that is part of the City University of New York (CUNY) system.

Study sample

The Opening Doors Learning Communities program recruited students who met the following criteria: 1) first-time incoming freshmen who planned to attend college full time during the day; 2) tested into developmental English (but did not test into English as a Second Language); 3) planned to attend college full time; and 4) between 17–34 years of age.

The study initially enrolled students who were aged 18 or older but later enrolled students who were 17 years old with parental consent. Students initially had to report a household income below 250% of the federal poverty level, but this income criterion was also subsequently removed. Students in four career majors (accounting, business, mental health, and early childhood education) were also excluded for the first year of the study because a separate learning community operated for them. After the 2003–04 academic year, students in those career majors could participate in the Opening Doors program because the career learning community program ended. Students who were eligible were given the opportunity to participate in the study; 1,534 students were eligible to participate. Students were randomly assigned to the intervention and comparision conditions. After random assignment, 769 students were in the intervention group and 765 were in the comparison group.

Among students in the sample, 55% were female, 38% were Black, 20% were Hispanic, and 27% were White. Seventy-nine percent were between 17–20 years old, 91% reported having no children, 28% indicated that their household was receiving government benefits (such as food stamps or Supplemental Security Income), 74% indicated they were financially dependent on their parents, 36% reported being currently employed, and 47% reported speaking a language other than English in their home.

Intervention group

The Opening Doors Learning Communities program was organized around an English course, where the course level was determined by the students' scores on the CUNY reading and writing skills assessment tests administered before enrollment. The English course was linked with two additional courses: an academic course required for the student's major and a one-credit freshman orientation course. The orientation course was available to all freshmen and teaches time management, study skills, college rules and procedures, and other topics relevant to new students. The three linked courses were taken together by groups of up to 25 students during their first semester in the study. The linked courses usually met one after the other. The Opening Doors Learning Communities operated only during a student's first semester.

Students in the learning communities were also offered other services, including 1) faculty collaboration and instructional practices, 2) enhanced counseling and support services offered by a counselor/case manager, 3) enhanced tutoring for the English course (and, in some cases, the subject matter course), and 4) textbook vouchers for the initial program semester and subsequent winter or summer intersession.

Over four semesters, the program included 40 learning communities: 31 with developmental English courses and 9 with college-level English courses. Learning community class sizes varied from 6–25 students, with an average of 17 students per learning community.

Comparison group

Students assigned to the comparison group were enrolled in classes for which they were eligible or that were required, and they could receive the college's standard services. In addition, similar to students in the intervention group, students in the comparison group were allowed to register for classes earlier than most freshmen, and they received advice on the registration process from Opening Doors staff.

Outcomes and measurement

Researchers reported outcomes at nine points in time: the program semester (i.e., the semester in which students were enrolled in a learning community), the first semester after the program, the second semester after the program, the third semester after the program, 2 years after randomization, 3 years after randomization, 4 years after randomization, 5 years after randomization, and 6 years after randomization. Participation in the learning communities began in fall 2003, spring 2004, fall 2004, and spring 2005. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

According to the study authors, Kingsborough Community College provided 1 hour of reassigned time for faculty to meet about course integration and support for students in learning communities (i.e., each 3-hour course was treated as a 4-hour course for purposes of determining each faculty member's teaching load). Each learning community also had an assigned tutor who attended the courses, and participating students received $150 textbook vouchers for the 12-week main session and a $75 textbook voucher for the subsequent 6-week winter or summer intersession for the campus bookstore.

Appendix A.2: Research details for Weiss et al. (2010)

Weiss, M. J., Visher, M. G., & Wathington, M. (2010). *Learning communities for students in developmental reading: An impact study at Hillsborough Community College*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED510961.pdf.

Table A2. Summary of findings

Meets WWC group design standards without reservations

		Study findings	
Outcome domain	Sample size	Average improvement index *(percentile points)*	Statistically significant
Academic achievement	832 students	+1	No
Postsecondary enrollment	1,071 students	–1	No
Credit accumulation	1,071 students	+3	No
Progress in developmental education	1,071 students	+1	No

Setting

The study took place at Hillsborough Community College (HCC), a large, urban community college in Tampa Bay, FL. The HCC has five campuses; three (Brandon, Dale Mabry, and Ybor City) participated in the Learning Communities Demonstration.

Study sample

To participate in the learning communities study at Hillsborough, students had to meet all of the following eligibility criteria: 1) at least 18 years old; 2) first-time students; and 3) placed into developmental reading—either College Preparatory Reading 1 or College Preparatory Reading 2 (i.e., one or two levels below college level). This level of placement was determined by scores on a state-mandated placement test. Students who were eligible were given the opportunity to participate in the study (participation was voluntary). Randomization was done at the student level. At the start of the study, 1,071 students were eligible to participate in the study; 709 were randomly assigned to the intervention group and 362 to the comparison group.

Among students in the sample, 57% were female. Thirty-seven percent were Black, 32% were Hispanic, and 25% were White. Seventy percent of the students were between 17 and 20 years old at the start of the study, 81% reported having no children, 16% indicated that their household was receiving government benefits (such as food stamps or Supplemental Security Income), 25% indicated that they were receiving financial aid, 56% reported being currently employed, and 29% reported speaking a language other than English in their home.

Intervention group

Students registered in a learning community that linked a College Success course with either College Preparatory Reading 1 or College Preparatory Reading 2, depending on how the student was placed. Both reading courses emphasized vocabulary acquisition, reading comprehension, and writing to improve literacy development. The College Success course concentrated on a variety of academic and personal subjects, such as educational goals, planning, time management, study skills, health concerns, and career counseling. Students were also informed about other academic resources available to them. Students enrolled in the reading and College Success courses as a pair, creating the learning communities where the same small groups (cohorts) of students took the two linked courses together. Notably, however, the study authors reported that the linking of the curricula across the two courses did not occur until the study's final semester.

Comparison group

Students assigned to the comparison group enrolled in any other classes for which they were eligible or that were required, and they could receive the college's standard services. All students who require one or more developmental courses must enroll in a College Success course; therefore, comparison group students had the option of enrolling in the course as well. However, they were not required to enroll immediately.

Outcomes and measurement

Researchers reported outcomes at three points in time: the program semester (i.e., the semester during which students were enrolled in a learning community), the first semester after the program, and the second semester after the program. Participation in the learning communities began in fall 2007, spring 2008, and fall 2008. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

The learning community model was already in existence at Hillsborough when the study started. According to the study authors, HCC supported a "paid coordinator who managed the program, strong support from college leadership, solid buy-in from faculty, and a collaborative relationship between academic and student affairs divisions." The paid coordinator's work from the first semester of implementation included organization of events and meetings for faculty development (e.g., strategies for active, collaborative learning and curricular integration), coordination of workshops and monthly meetings, and oversight of random assignment activities.

Appendix A.3: Research details for Weissman et al. (2011) [Houston]

Weissman, E., Butcher, K. F., Schneider, E., Teres, J., Collado, H., Greenberg, D., & Welbeck, R. (2011). *Learning communities for students in developmental math: Impact studies at Queensborough and Houston Community Colleges*. New York: National Center for Postsecondary Research. http://files.eric.ed.gov/fulltext/ED516646.pdf.

Table A3. Summary of findings **Meets WWC group design standards without reservations**

Outcome domain	Sample size	Study findings: Average improvement index *(percentile points)*	Study findings: Statistically significant
Postsecondary enrollment	1,273 students	+2	No
Credit accumulation	1,273 students	+0	No
Progress in developmental education	1,273 students	+2	No

Setting

The study took place at Houston Community College, a large community college system consisting of over 55,000 students attending six colleges located in and around Houston, TX. The learning communities project was conducted at three of the campuses around the city: Central, Northline, and Southeast.

Study sample

To be eligible for participation in the learning communities study, students had to meet all of the following criteria: 1) first-year student status; 2) placed into developmental math, including students in the lowest levels of developmental math (primarily Fundamentals of Mathematics I or Fundamentals of Mathematics II); and 3) available to take the learning community classes at their scheduled times. All students were placed at one of two developmental math levels based on a placement test (COMPASS). The study initially enrolled students who were 18 or older, but later enrolled students under 18. Across four semesters, 1,273 students were eligible to participate; 761 were randomly assigned the intervention group and 512 to the comparison group. Demographically, 67% of the entire sample of study participants were female, 55% were Hispanic, 35% were Black, and 3% were White. Sixty-three percent of the students in the sample were between 17 and 20 years old at the beginning of the study. In addition, 28% reported having at least one child, 29% were financially dependent on their parents, 41% were currently employed, and 46% spoke a language other than English in their home.

Intervention group

The learning communities at Houston Community College were designed for students at the lowest level of developmental math offered by the college: Fundamentals of Mathematics I (Math I). After passing Math I, students must pass both Fundamentals of Mathematics II and Intermediate Algebra before they can take a college-level course. Math I was linked with a student success course called College and Career Planning for the learning communities program. The student success course was designed to introduce students to tools and strategies that would help them achieve their college and career goals; included lessons on time management, test-taking skills, and setting goals; and provided information on available campus resources such as tutoring. Math I is required for all students who place into it, but students are not required to take it during their first semester of enrollment. However, college policy does require all students to take the College and Career Planning course during their first semester. The key part of the learning community was the link between Math I and the student success course, and the linked courses included at least three integrated assignments. In addition, collaboration among faculty and connections to support services were reported by the study authors as salient aspects of the program.

Comparison group

Comparison group students were advised that they were required to take developmental math courses as a prerequisite to college-level math, but they were not required to do so during the first semester. College staff assisted students in both conditions with registration for all of their courses. All first-year developmental students at the college were required to take the College and Career Planning course.

Outcomes and measurement

The study authors gathered outcome data from transcripts provided by the college. The data were available at the end of the program semester and for one semester after the program. In addition, cumulative results at two semesters post-assignment were available. Participation in the learning communities began in spring 2008, fall 2008, spring 2009, and fall 2009. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

The study authors reported that each campus had a faculty member coordinator who received course release time for their work on integrated curriculum planning. Faculty stipends varied from $200 to $400 per community taught. Campuses also varied in stipends for faculty planning for new joint courses (e.g., $200) and one-course release time for planning the learning community the semester before. Additional supports to students included: math tutoring, dedicated counseling, and development of online videos and PowerPoints into lessons accessed by students with purchased iPad touch devices. Field trips were supported by the campuses and incorporated into each class (one field trip per term).

Appendix A.4: Research details for Weissman et al. (2011) [Queensborough]

Weissman, E., Butcher, K. F., Schneider, E., Teres, J., Collado, H., Greenberg, D., & Welbeck, R. (2011). *Learning communities for students in developmental math: Impact studies at Queensborough and Houston Community Colleges.* New York: National Center for Postsecondary Research. http://files.eric.ed.gov/fulltext/ED516646.pdf.

Table A4. Summary of findings **Meets WWC group design standards without reservations**

		Study findings	
Outcome domain	Sample size	Average improvement index *(percentile points)*	Statistically significant
Postsecondary enrollment	1,034 students	+4	No
Credit accumulation	1,034 students	+2	No
Progress in developmental education	989 students	–1	No

Setting

The study took place at Queensborough Community College, a midsized community college located in Queens, NY, that is part of the City University of New York (CUNY) system.

Study sample

To be eligible for participation in the learning communities study, students had to meet all of the following criteria: 1) first-year student status,[11] 2) placed into developmental math (including Basic Mathematics and Problem Solving or Elementary Algebra), and 3) available to take the learning community classes at their scheduled times. All students were placed at one of two developmental math levels based on a placement test (COMPASS). The study initially enrolled students who were 18 or older, but later enrolled students under 18. Across four semesters, 1,034 students were eligible to participate; 608 were randomly assigned to the intervention group and 426 to the comparison group. Demographically, 56% of the sample were female, 33% were Hispanic, 31% were Black, 14% were White, and 12% were Asian/Pacific Islander. Seventy-eight percent of the students in the sample were between 17 and 20 years old at the beginning of the study. In addition, 7% reported having at least one child, 37% were financially dependent on their parents, 40% were currently employed, and 39% spoke a language other than English in their home.

Intervention group

The learning communities were designed for students enrolled in the two levels of developmental math offered by the college: Basic Mathematics and Problem Solving (two levels below the first college-level class) and Elementary Algebra (one level below). During the first semester of the study (fall 2007), each of these math classes was linked with either developmental English or college-level English. To better match students' needs and interest, during the remainder of the study (spring 2008, fall 2008, and spring 2009), the developmental math courses were linked with various college-level courses. In addition to the link with college-level English, other introductory courses without prerequisites—such as business, sociology, and speech—were offered and linked with developmental math. This structure gave students the opportunity to move up in the developmental math sequence, while allowing them to earn college credits at the same time.

Comparison group

Students assigned to the comparison group were advised that they were required to take developmental math courses as a prerequisite to college-level math, but they were not required to do so during the first semester. College staff assisted students in both conditions with registration for all of their courses.

Outcomes and measurement

The study authors gathered outcome data from transcripts provided by the college. The outcomes focused on achievement in math and completion of both developmental and college-level courses in math and other subjects. The data were available for three semesters (the program semester and two semesters after the program). In addition, cumulative results at four semesters post-assignment were available. Participation in the learning communities began in fall 2007, spring 2008, fall 2008, and spring 2009. Outcomes were reported in three domains: postsecondary enrollment, progress in developmental education, and credit accumulation. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

According to the study authors, beginning in the program's second semester, leaders in academic affairs and student services worked with the program coordinator, department chairs, and full-time faculty members to design and implement thematic learning community curricula. Faculty received professional development coaching that strengthened curricular integration, according to faculty surveys. Queensborough Community College provided faculty a stipend of $650 per semester.

Appendix A.5: Research details for Weissman et al. (2012) [Baltimore]

Weissman, E., Cullinan, D., Cerna, O., Safran, S., & Richman, P. (2012). *Learning communities for students in developmental English: Impact studies at Merced College and the Community College of Baltimore County*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED529251.pdf.

Table A5. Summary of findings **Meets WWC group design standards without reservations**

		Study findings	
Outcome domain	Sample size	Average improvement index *(percentile points)*	Statistically significant
Postsecondary enrollment	1,083 students	0	No
Credit accumulation	1,083 students	–1	No
Progress in developmental education	1,083 students	–2	No

Setting

The study took place at the Community College of Baltimore County (CCBC), a community college located in Baltimore, MD, that has three campuses and three extension centers in suburban Maryland. Two campuses of CCBC participated in the Learning Communities Demonstration: Catonsville and Essex.

Study sample

All new and returning students at CCBC were eligible to be included in the Learning Communities Demonstration study sample if they had placed into a developmental English course (either reading or writing) that was one level below college-level English (resources were directed toward those students who had the highest chance of getting to college level). This level of placement was determined by Accuplacer test scores. Students also had to be available for class during the times that the learning community classes were offered. The study initially enrolled students who were 18 or older, but later enrolled students under 18 with parental consent. Students who were eligible were given the opportunity to participate in the study. Randomization was done at the student level. Across four semesters, 1,083 students were eligible to participate; 650 were randomly assigned to the intervention group and 433 to the comparison group. Demographically, 59% of the sample were female, 67% were non-White (predominately Black), and 77% were between 17 and 20 years old. Furthermore, 16% reported having at least one child, 17% indicated that their household was receiving government benefits (such as food stamps or Supplemental Security Income), 46% indicated that they were receiving financial aid, 53% reported being currently employed, and 8% reported speaking a language other than English in their home.

Intervention group

The CCBC learning communities were organized around a developmental English course (either reading or writing). Students coenrolled in the developmental English course; a college-level content course (that was selected from a range of subject areas, such as sociology, psychology, or computer information); and a master learner session. The master learner session lasted for 1 hour per week and was a non-credit-bearing class that provided support and guidance as students worked through their linked courses. The session concentrated on helping students make connections between the content from the linked courses in each learning community and was designed to reinforce the instruction from those courses.

Comparison group

Students assigned to the comparison group were allowed to enroll in any other classes for which they were eligible or that were required, and they could receive the college's standard services. Many students in the comparison group enrolled in a credit-bearing student success course that was mandatory for all developmental reading students and that was, according to the study authors, similar in many respects to the master learner session taken by the learning community students in the intervention group.

Outcomes and measurement

Researchers reported outcomes at two points in time: the program semester (i.e., the semester in which students were enrolled in a learning community) and the first semester after the program. At CCBC, participation in the learning communities began in spring 2008, fall 2008, spring 2009, and fall 2009. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

According to the study authors, support for the learning communities provided by CCBC included: a cross-campus, lead program coordinator; support from a seasoned senior administrator; and an experienced learning community coordinator at each campus. Program support for faculty included professional development workshops on curricular integration and syllabi development. Faculty received a stipend of $750 or received a course load reduction equivalent to one credit hour for every learning community taught. Faculty who created new learning communities received an additional one-time stipend of $500 and $1,000, depending upon the degree of course integration. Faculty who taught master learner sessions received stipends of $2,250 or course load reductions of three credit hours.

Appendix A.6: Research details for Weissman et al. (2012) [Merced]

Weissman, E., Cullinan, D., Cerna, O., Safran, S., & Richman, P. (2012). *Learning communities for students in developmental English: Impact studies at Merced College and the Community College of Baltimore County*. New York: MDRC. http://files.eric.ed.gov/fulltext/ED529251.pdf

Table A6. Summary of findings **Meets WWC group design standards without reservations**

		Study findings	
Outcome domain	Sample size	Average improvement index *(percentile points)*	Statistically significant
Postsecondary enrollment	1,424 students	0	No
Credit accumulation	1,424 students	–1	No
Progress in developmental education	1,424 students	0	No

Setting

The study took place at Merced College, a midsized, rural community college located in California's Central Valley enrolling over 10,000 students.

Study sample

All new and returning students were eligible to be included in the Learning Communities Demonstration study sample if they had placed into developmental reading, writing, or both at one, two, or three developmental levels below Freshman Composition (the first college-level English course). Students assessed at four developmental levels below freshman composition (the lowest basic language and learning course) were not included in the study. This level of placement was determined by Accuplacer test scores. Students also had to be available for class during the times that the learning community classes were offered. The study initially enrolled students who were 18 or older, but later enrolled students under 18 with parental consent. Students who were eligible were given the opportunity to participate in the study (participation was voluntary). Randomization was done at the student level. Across four semesters, 1,424 students were eligible to participate; 711 were randomly assigned the intervention group and 713 to the comparison group. Demographically, 49% of the sample were female, 83% were non-White (predominately Hispanic), and 65% were between 17 and 20 years old. Furthermore, 27% reported having at least one child, 37% indicated that their household was receiving government benefits (such as food stamps or Supplemental Security Income), 28% indicated that they were receiving financial aid, 23% reported being currently employed, and 41% reported speaking a language other than English in their home.

Intervention group

The learning communities model at Merced College generally concentrated either on writing or on writing and reading combined. In the study, 11 of the 12 learning communities consisted of students who enrolled in a developmental writing course that was linked to either 1) a developmental reading or math course, 2) a college success course, or (3) an introductory college-level course (such as criminology, health, or music). One learning community linked developmental reading with a student success course. The learning communities were designed around a common theme shared between two courses (for example, writing about and understanding mathematical concepts). Students enrolled in two linked courses of a learning community formed a cohort, and they progressed together throughout the semester.

Comparison group

Students assigned to the comparison group were allowed to enroll in any other classes for which they were eligible or that were required, and they could receive the college's standard services.

Outcomes and measurement

Researchers reported outcomes at two points in time: the program semester (i.e., the semester in which students were enrolled in a learning community) and the first semester after the program. Participation in the learning communities began in spring 2008, fall 2008, spring 2009, and fall 2009. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

According to the study authors, Merced College provided participating instructors with a $1,000 stipend for each learning community they taught per semester. However, over the course of the study, stipends for faculty who taught multiple learning communities each term were reduced.

Appendix B: Outcome measures for each domain

Academic achievement	
Grade point average	Taken from school administrative records, this outcome assesses the grades that students earned in credit-bearing (i.e., nondevelopmental) courses.
Degree attainment	
Degree/certificate attainment	Taken from administrative data and from the National Student Clearinghouse, this outcome assesses the extent to which students earned a formal degree or certificate.
Postsecondary enrollment	
Registered for courses	Taken from school administrative records, this outcome assesses whether students registered for courses.
Enrolled in college	Taken from National Student Clearinghouse records, this outcome assesses whether students actually enrolled in college.
Credit accumulation	
College credits earned	Taken from school administrative records, this outcome assesses the number of regular college credits earned by students.
Progress in developmental education	
Passed all required developmental courses	Taken from school administrative records, this outcome assesses whether students passed all required developmental courses (e.g., both levels of developmental math for students needing two levels of remediation).
Passed targeted college-level introductory course	Taken from school administrative records, this outcome assesses whether students passed the targeted college-level introductory course (i.e., college-level English or college-level math).
Passed developmental education tests	Taken from school administrative records, this outcome assesses whether students were able to pass developmental skills assessment tests.

Appendix C.1: Findings included in the rating for the academic achievement domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Proportion of students earning at least a C average	College students	1,409	64%	59%	4%	0.11	4	nr
Domain average for academic achievement (Sommo et al., 2012)							**+4**	**nr**
Weiss et al. (2010)[b]								
Proportion of students earning at least a C average (program semester)	College students	832	73%	72%	1%	0.04	2	> .10
Proportion of students earning at least a C average (first semester postprogram)	College students	591	65%	66%	–1%	–0.04	–1	> .10
Domain average for academic achievement (Weiss et al., 2010)							**+1**	**> .10**
Domain average for academic achievement across all studies							**+3**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of each study's domain average was determined by the WWC. Some statistics may not sum as expected due to rounding. na = not applicable. nr = not reported.

[a] For Sommo et al. (2012), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study. This outcome is calculated by adjusting the percentages reported in Scrivener et al. (2008; Table 4.4) by removing those students with no grade point average (GPA). This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[b] For Weiss et al. (2010), a correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. This outcome is calculated by removing students with no GPA from the sample size, and combining the reported proportions of students with GPAs higher than a C average adjusted for the appropriate sample size. The *p*-values presented here were reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

Appendix C.2: Findings included in the rating for the degree attainment domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Earned a degree (within 6 years of randomization)	College students	1,534	36%	31%	5%	0.09	3	< .10
Domain average for degree attainment (Sommo et al., 2012)							**3**	**< .10**
Domain average for degree attainment across all studies							**+3**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. na = not applicable.

[a] For Sommo et al. (2012), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

Appendix C.3: Findings included in the rating for the postsecondary enrollment domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Enrolled in college	College students	1,534	87%	85%	3%	0.07	3	> .10
Registered for courses	College students	1,534	93%	91%	2%	0.06	2	> .10
Domain average for postsecondary enrollment (Sommo et al., 2012)							**2**	**> .10**
Weiss et al. (2010)[b]								
Registered for courses	College students	1,071	82%	83%	–1%	–0.03	–1	> .10
Domain average for postsecondary enrollment (Weiss et al., 2010)							**–1**	**> .10**
Weissman et al. (2011) [Houston][c]								
Registered for courses	College students	1,273	84%	81%	3%	0.06	2	> .10
Domain average for postsecondary enrollment (Weissman et al., 2011) [Houston]							**2**	**> .10**
Weissman et al. (2011) [Queensborough][d]								
Registered for courses	College students	1,034	92%	88%	4%	0.11	4	< .10
Domain average for postsecondary enrollment (Weissman et al., 2011) [Queensborough]							**4**	**< .10**
Weissman et al. (2012) [Baltimore][e]								
Registered for courses	College students	1,083	85%	84%	0%	0.00	0	> .10
Domain average for postsecondary enrollment (Weissman et al., 2012) [Baltimore]							**0**	**> .10**
Weissman et al. (2012) [Merced][f]								
Registered for courses	College students	1,424	73%	74%	–1%	–0.01	0	> .10
Domain average for postsecondary enrollment (Weissman et al., 2012) [Merced]							**0**	**> .10**
Domain average for postsecondary enrollment across all studies							**+1**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of each study's domain average was determined by the WWC. Some statistics may not sum as expected due to rounding. na = not applicable.

[a] For Sommo et al. (2012), the Enrolled in college outcome was reported in the supplemental study by Scrivener et al. (2008; Table 4.2), and the Registered for courses outcomes was reported in the supplemental study by Bloom and Scrivener (2005; Table 5). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. The *p*-values presented here were reported in the original studies. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[c] For Weissman et al. (2011) [Houston], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[d] For Weissman et al. (2011) [Queensborough], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[e] For Weissman et al. (2012) [Baltimore], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[f] For Weissman et al. (2012) [Merced], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

Appendix C.4: Findings included in the rating for the credit accumulation domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Regular credits earned	College students	1,534	27.7 (nr)	26.2 (nr)	1.5	0.07	3	> .10
Domain average for credit accumulation (Sommo et al., 2012)							**3**	**> . 10**
Weiss et al. (2010)[b]								
Regular credits earned	College students	1,071	5.3 (nr)	4.9 (nr)	0.4	0.08	3	> .10
Domain average for credit accumulation (Weiss et al., 2010)							**3**	**> .10**
Weissman et al. (2011) [Houston][c]								
Regular credits earned	College students	1,273	4.7 (nr)	4.7 (nr)	0	0.00	0	> .10
Domain average for credit accumulation (Weissman et al., 2011) [Houston]							**0**	**> .10**
Weissman et al. (2011) [Queensborough][d]								
Regular credits earned	College students	1,034	12.4 (nr)	11.8 (nr)	0.6	0.04	2	> .10
Domain average for credit accumulation (Weissman et al., 2011) [Queensborough]							**2**	**> .10**
Weissman et al. (2012) [Baltimore][e]								
Regular credits earned	College students	1,424	5.9 (nr)	6.0 (nr)	–0.1	–0.02	–1	> .10
Domain average for credit accumulation (Weissman et al., 2012) [Baltimore]							**–1**	**> .10**
Weissman et al. (2012) [Merced][f]								
Regular credits earned	College students	1,083	4.9 (nr)	5.1 (nr)	–0.2	–0.02	–1	> .10
Domain average for credit accumulation (Weissman et al., 2012) [Merced]							**–1**	**> .10**
Domain average for credit accumulation across all studies							**+1**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average

rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of each study's domain average was determined by the WWC. Some statistics may not sum as expected due to rounding. na = not applicable. nr = not reported.

[a] For Sommo et al. (2012), regular credits earned were reported in the supplemental study by Scrivener et al. (2008; Table 4.4). No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[c] For Weissman et al. (2011) [Houston], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[d] For Weissman et al. (2011) [Queensborough], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[e] For Weissman et al. (2012) [Baltimore], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[f] For Weissman et al. (2012) [Merced], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

Appendix C.5: Findings included in the rating for the progress in developmental education domain

			Mean (standard deviation)		WWC calculations			
Outcome measure	**Study sample**	**Sample size**	**Intervention group**	**Comparison group**	**Mean difference**	**Effect size**	**Improvement index**	***p*-value**
Sommo et al. (2012)[a]								
Passed both developmental education tests	College students	1,534	65%	60%	5%	0.10	4	< .10
Domain average for progress in developmental education (Sommo et al., 2012)							**4**	**< .10**
Weiss et al. (2010)[b]								
Completed college preparatory reading	College students	1,071	60%	59%	2%	0.03	1	>.10
Domain average for progress in developmental education (Weiss et al., 2010)							**1**	**> .10**
Weissman et al. (2011) [Houston][c]								
Passed both required developmental math courses	College students	1,273	18%	16%	2%	0.06	2	> .10
Domain average for progress in developmental education (Weissman et al., 2011) [Houston]							**2**	**> .10**
Weissman et al. (2011) [Queensborough][d]								
Passed college math	College students	989	10%	10%	0%	–0.01	–1	> .10
Domain average for progress in developmental education (Weissman et al., 2011) [Queensborough]							**–1**	**> .10**
Weissman et al. (2012) [Baltimore][e]								
Passed college English	College students	1,083	27%	30%	–3%	–0.06	–2	> .10
Domain average for progress in developmental education (Weissman et al., 2012) [Baltimore]							**–2**	**> .10**

Weissman et al. (2012) [Merced][f]								
Passed college English	College students	1,424	5%	5%	0%	0	0	> .10
Domain average for progress in developmental education (Weissman et al., 2012) [Merced]							**0**	**> .10**
Domain average for progress in developmental education across all studies							**+1**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of each study's domain average was determined by the WWC. Some statistics may not sum as expected due to rounding. na = not applicable.

[a] For Sommo et al. (2012), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[c] For Weissman et al. (2011) [Houston], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[d] For Weissman et al. (2011) [Queensborough], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[e] For Weissman et al. (2012) [Baltimore], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

[f] For Weissman et al. (2012) [Merced], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-value presented here was reported in the original study. This study is characterized as having indeterminate effects because the reported effect sizes are neither statistically significant nor large enough to be substantively important. For more information, please refer to the WWC Standards and Procedures Handbook, version 3.0, p. 26.

Appendix D.1: Summary of subgroup findings for the academic achievement domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Proportion of students earning at least a C average	Women	775	66%	64%	2%	0.06	2	nr
Proportion of students earning at least a C average	Men	634	60%	54%	6%	0.16	6	nr
Weiss et al. (2010)[b]								
Proportion of students earning at least a C average (program semester)	Women	488	77%	76%	1%	0.04	1	nr
Proportion of students earning at least a C average (program semester)	Men	344	68%	65%	3%	0.07	3	nr
Proportion of students earning at least a C average (first semester postprogram)	Men	237	60%	65%	–5%	–0.13	–5	nr

Table Notes: The supplemental findings presented in this table are additional subgroup findings from the studies in this report that do not factor in the determination of the intervention rating. The subgroup analyses examine the effects of the intervention by gender. Total group scores were used for rating purposes and are presented in Appendices C.1–C.5. For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. nr = not reported.

[a] For Sommo et al. (2012), the gender subgroup analyses were reported in the supplemental Scrivener et al. (2008) study in Appendix Table D.4. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. This calculation removed students with no GPA from the sample, and combined the proportions of students reporting at least a C average while adjusting for the analysis sample size. The study did not report *p*-values for this outcome as presented here.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup data included were provided by the authors following an author query. The outcomes reported remove students with no GPA and calculate the proportion of students earning at least a C average by combining different ranges reported and adjusting for the analysis sample size. The proportion of students earning at least a C average in the first semester postprogram for women was not included because it did not meet WWC group design standards, owing to attrition. No *p*-values were reported in the additional data.

Appendix D.2: Summary of subgroup findings for the postsecondary enrollment domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Enrolled in college	Women	837	87%	84%	3%	0.08	3	> .10
Enrolled in college	Men	697	88%	85%	2%	0.07	3	> .10
Registered for courses	Women	837	94%	92%	2%	0.06	2	> .10
Registered for courses	Men	697	92%	90%	2%	0.06	2	> .10
Weiss et al. (2010)[b]								
Registered for courses	Women	609	85%	84%	1%	0.02	1	nr
Registered for courses	Men	462	78%	83%	–5%	–0.13	–5	nr
Weissman et al. (2011) [Houston][c]								
Registered for courses	Women	849	88%	80%	8%	0.17	7	< .05
Registered for courses	Men	424	78%	84%	–6%	–0.13	–5	> .10
Weissman et al. (2011) [Queensborough][d]								
Registered for courses	Women	579	92%	88%	4%	0.12	5	> .10
Registered for courses	Men	455	92%	88%	4%	0.12	5	> .10
Weissman et al. (2012) [Baltimore][e]								
Registered for courses	Women	636	85%	85%	0%	0.00	0	> .10
Registered for courses	Men	447	84%	84%	0%	–0.01	0	> .10
Weissman et al. (2012) [Merced][e]								
Registered for courses	Women	730	75%	75%	0%	–0.01	0	> .10
Registered for courses	Men	694	72%	72%	–1%	–0.01	0	>. 10

Table Notes: The supplemental findings presented in this table are additional subgroup findings from the studies in this report that do not factor in the determination of the intervention rating. The subgroup analyses examine the effects of the intervention by gender. Total group scores were used for rating purposes and are presented in Appendices C.1–C.5. For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. Some statistics may not sum as expected due to rounding. nr = not reported.

[a] For Sommo et al. (2012), the gender subgroup analyses were reported in the supplemental Scrivener et al. (2008) study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study. The college enrollment outcomes were reported in Appendix D.6 of the study, and the course registration outcomes were reported in Table D.2 of the Scrivener et al. (2008) report.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The data included were provided by the authors following an author query. No *p*-values were reported in the additional data, but WWC-calculated *p*-values were not significant at the .05 level.

[c] For Weissman et al. (2011) [Houston], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup outcomes were reported in Table A.10 of the study. The *p*-values presented here were reported in the original study.

[d] For Weissman et al. (2011) [Queensborough], no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup outcomes were reported in Table A.5 of the study. The *p*-values presented here were reported in the original study.

[e] For Weissman et al. (2012), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup data included were provided by the authors following an author query. The *p*-values presented here were reported by the authors.

Appendix D.3: Summary of subgroup findings for the credit accumulation domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Regular credits earned	Women	837	28.9 (nr)	28.5 (nr)	0.4	0.01	1	> .10
Regular credits earned	Men	697	26.4 (nr)	23.5 (nr)	2.9	0.14	5	< .10
Weiss et al. (2010)[b]								
Regular credits earned	Women	609	5.6 (5.5)	5.4 (5.9)	0.2	0.04	2	nr
Regular credits earned	Men	462	5.0 (5.4)	4.2 (5.2)	0.8	0.15	6	nr
Weissman et al. (2011) [Houston][c]								
Regular credits earned	Women	849	5.2 (nr)	5.0 (nr)	0.2	0.05	2	> .10
Regular credits earned	Men	424	3.5 (nr)	4.3 (nr)	–0.8	–0.16	–6	> .10
Weissman et al. (2011) [Queensborough][d]								
Regular credits earned	Women	579	13.2 (nr)	11.8 (nr)	1.4	0.11	4	> .10
Regular credits earned	Men	455	11.4 (nr)	11.7 (nr)	–0.3	–0.02	–1	> .10

Table Notes: The supplemental findings presented in this table are additional subgroup findings from the studies in this report that do not factor in the determination of the intervention rating. The subgroup analyses examine the effects of the intervention by gender. Total group scores were used for rating purposes and are presented in Appendices C.1–C.5. For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. nr = not reported.

[a] For Sommo et al. (2012), the gender subgroup analyses were reported in the supplemental Scrivener et al. (2008) study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup data included were provided by the authors following an author query. No *p*-values were reported in the additional data, but WWC calculated *p*-values were not significant at the .05 level.

[c] For Weissman et al. (2011), the subgroup outcomes for the Houston site were reported in Table A.10 of the study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

[d] For Weissman et al. (2011), the subgroup outcomes for the Queensborough site were reported in Table A.5 of the study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

Appendix D.4: Summary of subgroup findings for the progress in developmental education domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Sommo et al. (2012)[a]								
Passed both developmental education tests	Women	837	69%	67%	2%	0.04	2	> .10
Passed both developmental education tests	Men	697	60%	52%	8%	0.16	6	< .05
Weiss et al. (2010)[b]								
Completed college preparatory reading	Women	609	71%	68%	4%	0.08	3	nr
Completed college preparatory reading	Men	462	62%	57%	5%	0.10	4	nr
Weissman et al. (2011) [Houston][c]								
Passed both required developmental math courses	Women	849	19%	15%	4%	0.10	4	> .10
Passed both required developmental math courses	Men	424	16%	16%	–1%	–0.01	–1	> .10
Weissman et al. (2011) [Queensborough][d]								
Passed college math	Women	561	12%	9%	3%	0.11	5	> .10
Passed college math	Men	428	8%	13%	–5%	–0.16	–6	< .10
Weissman et al. (2012) [Baltimore][e]								
Passed college English	Women	636	29%	33%	–4%	–0.08	–3	> .10
Passed college English	Men	447	24%	25%	–1%	–0.02	–1	> .10
Weissman et al. (2012) [Merced][e]								
Passed college English	Women	730	7%	6%	0%	0.01	0	> .10
Passed college English	Men	694	4%	4%	0%	0.00	0	> .10

Table Notes: The supplemental findings presented in this table are additional subgroup findings from the studies in this report that do not factor in the determination of the intervention rating. The subgroup analyses examine the effects of the intervention by gender. Total group scores were used for rating purposes and are presented in Appendices C.1–C.5. For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on individual outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average individual's percentile rank that can be expected if the individual is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. Some statistics may not sum as expected due to rounding. nr = not reported.

[a] For Sommo et al. (2012), the gender subgroup analyses were reported in the supplemental Scrivener et al. (2008) study in Appendix Table D.5. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

[b] For Weiss et al. (2010), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The data included were provided by the authors following an author query. No *p*-values were reported in the additional data, but WWC calculated *p*-values were not significant at the .05 level. Data in this table reflect the cumulative rates for completion of developmental reading.

[c] For Weissman et al. (2011), the subgroup outcomes for the Houston site were reported in Table A.9 of the study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

[d] For Weissman et al. (2011), the subgroup outcomes for the Queensborough site were reported in Table A.4 of the study. No corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The *p*-values presented here were reported in the original study.

[e] For Weissman et al. (2012), no corrections for clustering or multiple comparisons and no difference-in-differences adjustments were needed. The gender subgroup data and the *p*-values presented here were provided by the authors.

Endnotes

[1] *Linked learning communities* do not have a single developer or official description. The descriptive information for this program was obtained from publicly available sources, including the research articles reviewed in this report (e.g., Inkelas & Soldner, 2011; Lenning & Ebbers, 1999). The literature search was completed in March 2013 and updated in August 2013.

[2] Postsecondary education refers to any formal education beyond high school; most commonly, college or university.

[3] Inkelas, K. K., & Soldner, M. (2011). Undergraduate living-learning programs and student outcomes. In J. Smart & M. Paulsen (Eds.), *Handbook of theory and research* (pp. 335–368). New York: Springer.

[4] Smith, B. L., MacGregor, J., Matthews, R. S., & Gabelnick, F. (2004). *Learning communities: Reforming undergraduate education*. San Francisco, CA: Wiley.

[5] E.g., Lenning, O. T., & Ebbers, L. H. (1999). The powerful potential of learning communities: Improving education for the future. *ASHE–ERIC Higher Education Report, 26*(6). Washington, DC: Graduate School of Education and Human Development, George Washington University. http://eric.ed.gov/?id=ED428606; Shapiro, N. S., & Levine, J. H. (1999). *Creating learning communities: A practical guide to winning support, organizing for change, and implementing programs.* San Francisco, CA: Jossey–Bass. http://eric.ed.gov/?id=ED434624.

[6] For criteria used in the determination of the rating of effectiveness and extent of evidence, see the WWC Rating Criteria on p. 34. These improvement index numbers show the average and range of student-level improvement indices for all findings across the studies.

[7] For typologies, see Gabelnick, F., MacGregor, J., Matthews, R. S., & Smith, B. L. (1990). Learning communities: Creating connections among students, faculty, and disciplines. *New Directions for Teaching and Learning, 41*(spring). San Francisco, CA: Jossey–Bass; Inkelas, K. K., & Soldner, M. (2011). Undergraduate living-learning programs and student outcomes. In J. Smart & M. Paulsen (Eds.), *Handbook of theory and research* (pp. 335–368). New York: Springer; Lenning, O. T., & Ebbers, L. H. (1999). The powerful potential of learning communities: Improving education for the future. *ASHE–ERIC Higher Education Report, 26*(6). Washington, DC: Graduate School of Education and Human Development, George Washington University. http://eric.ed.gov/?id=ED428606; Shapiro, N. S., & Levine, J. H. (1999). *Creating learning communities: A practical guide to winning support, organizing for change, and implementing programs*. San Francisco, CA: Jossey–Bass. http://eric.ed.gov/?id=ED434624; Smith, B. L., MacGregor, J., Matthews, R. S., & Gabelnick, F. (2004). *Learning communities: Reforming undergraduate education*. San Francisco, CA: Wiley.

[8] Inkelas, K. K., & Soldner, M. (2011). Undergraduate living-learning programs and student outcomes. In J. Smart & M. Paulsen (Eds.), *Handbook of theory and research* (pp. 335–368). New York: Springer.

[9] A term adapted from Smith, B. L., MacGregor, J., Matthews, R. S., & Gabelnick, F. (2004). *Learning communities: Reforming undergraduate education*. San Francisco, CA: Wiley.

[10] Readers interested in more information regarding the challenges associated with implementing the basic linked learning community model and potential solutions to those challenges are referred to Visher, M. G., Schneider, E., Wathington, H., & Collado, H. (2010). *Scaling up learning communities: The experience of six community colleges*. New York: MDRC. http://eric.ed.gov/?id=ED509307.

[11] Returning students who had failed developmental math and transfer students who had fewer than 15 credits were also eligible to participate at Queensborough.

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WWC Rating Criteria

Criteria used to determine the rating of a study

Study rating	Criteria
Meets WWC group design standards without reservations	A study that provides strong evidence for an intervention's effectiveness, such as a well-implemented RCT.
Meets WWC group design standards with reservations	A study that provides weaker evidence for an intervention's effectiveness, such as a QED or an RCT with high attrition that has established equivalence of the analytic samples.

Criteria used to determine the rating of effectiveness for an intervention

Rating of effectiveness	Criteria
Positive effects	Two or more studies show statistically significant positive effects, at least one of which met WWC group design standards for a strong design, AND No studies show statistically significant or substantively important negative effects.
Potentially positive effects	At least one study shows a statistically significant or substantively important positive effect, AND No studies show a statistically significant or substantively important negative effect AND fewer or the same number of studies show indeterminate effects than show statistically significant or substantively important positive effects.
Mixed effects	At least one study shows a statistically significant or substantively important positive effect AND at least one study shows a statistically significant or substantively important negative effect, but no more such studies than the number showing a statistically significant or substantively important positive effect, OR At least one study shows a statistically significant or substantively important effect AND more studies show an indeterminate effect than show a statistically significant or substantively important effect.
Potentially negative effects	One study shows a statistically significant or substantively important negative effect and no studies show a statistically significant or substantively important positive effect, OR Two or more studies show statistically significant or substantively important negative effects, at least one study shows a statistically significant or substantively important positive effect, and more studies show statistically significant or substantively important negative effects than show statistically significant or substantively important positive effects.
Negative effects	Two or more studies show statistically significant negative effects, at least one of which met WWC group design standards for a strong design, AND No studies show statistically significant or substantively important positive effects.
No discernible effects	None of the studies show a statistically significant or substantively important effect, either positive or negative.

Criteria used to determine the extent of evidence for an intervention

Extent of evidence	Criteria
Medium to large	The domain includes more than one study, AND The domain includes more than one school, AND The domain findings are based on a total sample size of at least 350 students, OR, assuming 25 students in a class, a total of at least 14 classrooms across studies.
Small	The domain includes only one study, OR The domain includes only one school, OR The domain findings are based on a total sample size of fewer than 350 students, AND, assuming 25 students in a class, a total of fewer than 14 classrooms across studies.

Glossary of Terms

Attrition Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.

Clustering adjustment If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.

Confounding factor A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.

Design The design of a study is the method by which intervention and comparison groups were assigned.

Domain A domain is a group of closely related outcomes.

Effect size The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.

Eligibility A study is eligible for review and inclusion in this report if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.

Equivalence A demonstration that the analysis sample groups are similar on observed characteristics defined in the review area protocol.

Extent of evidence An indication of how much evidence supports the findings. The criteria for the extent of evidence levels are given in the WWC Rating Criteria on p. 34.

Improvement index Along a percentile distribution of students, the improvement index represents the gain or loss of the average student due to the intervention. As the average student starts at the 50th percentile, the measure ranges from –50 to +50.

Multiple comparison adjustment When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.

Quasi-experimental design (QED) A quasi-experimental design (QED) is a research design in which subjects are assigned to intervention and comparison groups through a process that is not random.

Randomized controlled trial (RCT) A randomized controlled trial (RCT) is an experiment in which investigators randomly assign eligible participants into intervention and comparison groups.

Rating of effectiveness The WWC rates the effects of an intervention in each domain based on the quality of the research design and the magnitude, statistical significance, and consistency in findings. The criteria for the ratings of effectiveness are given in the WWC Rating Criteria on p. 34.

Single-case design A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.

Standard deviation The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample tend to be spread out over a large range of values.

Statistical significance Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ($p < .05$).

Substantively important A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the WWC Procedures and Standards Handbook (version 3.0) for additional details.