

REVIEW PROTOCOL FOR STUDIES OF INTERVENTIONS FOR DEVELOPMENTAL STUDENTS IN POSTSECONDARY EDUCATION VERSION 3.0

Topic Area Focus

Not all students enrolled in college are prepared to do college-level work in all subjects. Anticipating this need, most colleges have established processes that are intended to identify students who are not prepared to do college-level work (e.g., by establishing a threshold score on an entrance test, such as the SAT or ACT, and/or requiring that students take a placement test). Students who are not prepared for college-level work may be placed into developmental (or remedial) education, which involves taking courses that are intended to help students succeed in college-level courses at their institution. These courses are usually offered on a non-credit basis; therefore, they do not count toward graduation requirements.

This protocol guides the review of research that informs What Works Clearinghouse (WWC) reviews in the area of interventions for developmental students in postsecondary education. The review-specific protocol is used in conjunction with the [*WWC Procedures and Standards Handbook \(version 3.0\)*](#). These reviews focus on interventions for incoming and current postsecondary students that aim to promote successful completion of developmental education, with a primary focus on both increasing developmental education completion rates and increasing the rate of degree or certification attainment.

In order to be eligible for review interventions must have been designed to help students be ready to pursue college-level coursework. Interventions in this area are diverse, and by way of example can include (but are not limited to):

- Learning communities (curricular linkages that provide students with a deeper examination and/or integration of the themes and concepts that they are learning; models include residential learning communities and cohort-based learning communities)
- Bridge interventions (remedial interventions that occur prior to the start of the first semester of postsecondary education)
- College success courses (courses that teach a variety of skills, including, but not limited to, study skills, and that often serve as an orientation to college life)
- Instructional strategies (studies of different instructional techniques, including but not limited to infusing metacognitive strategies into class instruction)
- Psychological interventions (interventions based on applied psychology, such as interventions to reduce math anxiety or to increase motivation)
- Specific skill instruction (embedding study skill instruction into a developmental education course)
- Supplemental instruction (providing additional instructional time)

See the section “**Specific Intervention Operational Definitions,**” below for the operational definitions for interventions that are the subject (or potentially are the subject) of WWC reviews.

A systematic review of the evidence in this topic area addresses the following questions:

- Does the intervention appear to be effective?
- Does the effectiveness of the intervention appear to differ by type of outcome?
- Which interventions are particularly effective for subgroups of students (including, but not limited to, first-generation college students, economically disadvantaged students, and racial/ethnic minority students)?

Identifying Studies for Review

The *WWC Procedures and Standards Handbook* discusses the general procedures for conducting a literature search. For the Interventions for Students in Developmental Education topic area, a broad search was conducted to identify potentially relevant intervention studies. For future WWC intervention reports under this topic area, a secondary search will be performed to identify any studies of the intervention that were not identified in the initial search. Furthermore, once interventions have been identified as being targets for an intervention report, the WWC will supplement the electronic database search with targeted searches of government and non-government agency websites, relevant non-profit organizations that might fund research on the intervention, and by reviewing the bibliographies of literature reviews, meta-analyses, and primary studies of the intervention under review. The broad search for the Interventions for Students in Developmental Education topic area is detailed in Appendix A. For future intervention reports, the secondary search is described in Appendices B.1 and B2.

ELIGIBILITY CRITERIA AND EVIDENCE STANDARDS

Studies must meet several criteria to be eligible for review. These relate to the population that was sampled, the study design that was used, the outcomes that were measured, and when the study was conducted. Each of these is discussed below.

Populations to be Included

To be eligible for review under this protocol, a study must include (a) postsecondary students (including students who have been admitted to college but who have not yet started their college careers) (b) in the United States or Canada, (c) who are, have been recommended for, or are at risk for, being placed into developmental education.

In general, the WWC determines a study rating based on average intervention effects and will report subgroup analyses only for groups that are identified in the protocol as being of theoretical, policy, or practical interest. For studies reviewed under this protocol, the default subgroups will be students who are (a) first-generation college students, (b) racial/ethnic minorities, (c) students from low socioeconomic status backgrounds, e.g., Pell Grant students, and (d) community college students. In addition, the WWC will report subgroup effects for gender when they are available, and for the level of academic preparation.

Types of Studies to be Reviewed

In order to be eligible for review a study must be a primary analysis of the effects of an intervention. If a study does not examine the effects of an intervention, or if it is not a primary analysis (e.g., if it is a meta-analysis or other literature review), then it is not eligible for review.

In addition, the study must have an eligible design. Eligible study designs include randomized controlled trials (RCTs), regression discontinuity designs, nonequivalent comparison group designs, and certain types of single-case designs. The WWC currently does not have standards for other types of quasi-experimental designs (QEDs), such as the instrumental variable approach and interrupted time series designs. Therefore, studies using these types of research designs are not eligible for review under this protocol.

Relevant Outcome Domains

To be eligible for review a study must also assess a relevant outcome domain. The content expert, in consultation with the review team, identified the following domains to guide this review: (a) access and enrollment, (b) progress through developmental education, (c) credit accumulation, (d) academic achievement, (e) attainment, and (f) the labor market. Measures of actual behavior are preferred to those that measure intentions and related constructs. When studies present results for both types of measures for an outcome (i.e., both intention to enroll and actual enrollment), the WWC will focus on actual behaviors.

- ***Access and enrollment*** refers to the process of applying to, actually enrolling, and attending a postsecondary institution. Examples of ways that enrollment might be operationally defined in studies include (a) applied vs. did not apply to college, (b) number of applications completed, (c) attended vs. did not attend a postsecondary institution, (d) selectivity of enrollment institution, (e) full-time vs. part-time enrollment, and (f) 4-year vs. 2-year vs. non-enrollment.
- ***Progress through developmental education*** refers to the process of completing required developmental coursework. Examples of ways that progress through developmental education might be operationally defined include (a) completed vs. did not complete developmental education coursework, (b) completed vs. did not complete first college-level course in which remediation was needed, and (c) grades earned in developmental courses.
- ***Credit accumulation*** refers to progress toward the completion of a degree, certificate, or program. Examples of ways that credit accumulation might be operationally defined in studies include (a) number of credits earned toward degree completion, (b) proportion of degree-bearing vs. non-degree-bearing credits earned, (c) ratio of credits earned to credits attempted, and (d) enrollment persistence. If a study assesses credit accumulation and enrollment persistence, the former is the preferred measure.
- ***Academic achievement*** assesses the extent to which students adequately complete expected coursework. Examples of ways that academic achievement might be

operationally defined in studies include grade point average and the ratio of courses passed vs. failed.

- **Attainment** refers to the completion of a degree, certificate, or program. Examples of ways attainment might be operationally defined in a study include certificate completion rates and degree completion rates.
- **Labor market** refers to outcomes related to employment after the postsecondary experience. Examples of ways that labor market outcomes might be operationally defined in studies include (a) employed vs. not, (b) employed full-time vs. employed part-time, (c) employed in field of study vs. not, and (d) income earned.

Outcomes measured at different points in time. For most outcomes in the postsecondary domain, the longest follow-up period available for a variable will be selected as primary; findings from any earlier time points will also be included in supplemental tables. In the access and enrollment domain (defined below), the *first* measure of enrollment (e.g., enrolled vs. not enrolled) will be selected as primary. Measures of enrollment that occur *after* the first semester or year of college would fall under the credit accumulation domain, and the longest follow-up period will be selected as the primary measure.

Timeframe

Studies must have been conducted after 1992 to be eligible for review under this protocol.

SPECIFIC INTERVENTION OPERATIONAL DEFINITIONS¹

Learning Communities

Learning communities are curricular linkages that provide students with a deeper examination and/or integration of the themes and concepts that they are learning (Inkelas & Soldner, 2008). There are many different models of learning communities (for example, residential learning communities; see Gabelnick, MacGregor, Matthews, & Smith, 1990; Inkelas & Soldner, 2008; Lenning & Ebbers, 1999 for typologies). The WWC review focuses on two types: linked learning communities and residential learning communities.

Linked learning communities involve linked courses with mutually reinforcing themes and assignments. Studies of this version of the learning communities model will have students take at least two courses together (i.e., in the same classroom at the same time). At least two of the linked courses must be taken during the same semester or quarter.

Residential learning communities involve students who live together (usually in a residential dormitory), take certain classes together, and engage in structured co-curricular and extra-curricular activities.

¹ This section of the protocol will be updated as the WWC starts new reports summarizing the research on interventions for students in developmental education.

Bridge Interventions

Developmental *bridge interventions* are programs that aim to provide postsecondary enrollees with academic and college preparation skills. The goal of developmental bridge interventions is to provide students with targeted academic support and social capital needed to succeed in college. Typically, these programs will provide accelerated instruction in one or more subject areas (e.g., math, English, reading), provide general academic or other student support services, provide information about the academic expectations and cultural contexts of colleges, and expose students to college faculty and administrators. These “summer bridge” programs typically provide services in the summer or other period immediately preceding postsecondary enrollment, although additional supplementary or ongoing services may be provided after enrollment. These interventions can be delivered in a residential or non-residential framework, and can involve either mandatory or voluntary participation.

REVIEW OF STUDIES AGAINST WWC EVIDENCE STANDARDS

All studies will be reviewed against the WWC Evidence Standards, using the [*WWC Procedures and Standards Handbook \(version 3.0\)*](#). Generally, these standards assess outcome reliability and validity, attrition, baseline equivalence, and similar methodological and statistical issues. This review determines the overall WWC study rating (see the *Procedures and Standards Handbook* for further details). Details related to sample attrition in RCTs and baseline equivalence in QEDs and high-attrition RCTs are outlined below to highlight the way they are operationalized in this topic area.

Sample Attrition

Reviews of studies that are governed by this protocol will use the *liberal* boundary for attrition. The selection of this boundary was based on the assumption that most attrition in studies of interventions focused on postsecondary students is due to factors that are not strongly related to intervention status. The WWC’s postsecondary content expert can change the boundary to use if this assumption seems inappropriate for a given intervention; any such changes will be documented in the associated WWC reports.

Baseline Equivalence

If the study design is a randomized controlled trial or regression discontinuity design with high levels of attrition, or a quasi-experimental design, the study must demonstrate baseline equivalence of the intervention and comparison groups for the analytic sample.

If demonstration of baseline equivalence is required for a study, the following pre-intervention (or baseline) characteristics will be used:

- A pre-intervention measure of the outcome (i.e., a pretest) or a close proxy. In the postsecondary literature, pretests on the outcomes are often not available. When pretests or a close proxy are not available, studies must demonstrate baseline equivalence on the following two domains:
 - A baseline measure of academic achievement (e.g., high school grade point average, SAT/ACT scores), and
 - A baseline measure of student socio-economic status (e.g., FAFSA expected family contribution, family income, free- or reduced-price lunch status, parent education levels, Pell Grant eligibility)

In cases where multiple baseline measures of SES and/or academic achievement are available, the content expert is responsible for selecting the variable(s) to be used in the baseline equivalence assessment prior to the equivalence assessment being performed. For example, if both math and verbal scores on a college entrance exam are available, and the primary outcome is whether or not students passed their first college-level math course, then the content expert may decide that the score on the math portion of the entrance exam is the only achievement measure on which baseline equivalence will be assessed. However, if the primary outcome is attainment, then the content expert might decide to assess the balance on both the math subtest and the verbal subtest.

PROCEDURES FOR STATISTICAL ADJUSTMENT FOR STUDIES WITH BASELINE COVARIATE IMBALANCE

These procedures apply to all studies for which baseline equivalence must be demonstrated (i.e., RCTs with high attrition and QED studies).

If a pretest or close proxy is available for an outcome, and the difference between conditions at baseline is shown to be within the range that requires statistical adjustment, the statistical adjustment is only needed for that outcome. For example, if vocabulary, reading comprehension, and reading fluency are available as pre- and post-intervention measures, and the pre-intervention difference in reading comprehension requires statistical adjustment but the others do not, only the analysis of reading comprehension must adjust for baseline differences in reading comprehension (no adjustments are required for the other outcomes).

For outcomes that do not have a pretest or close proxy, if the difference between conditions at baseline on one of the required covariates is shown to be within the range that requires statistical adjustment, then adjustment is required only for the covariate in the adjustment range. For example, if academic achievement is judged to be within the range that requires statistical adjustment, and SES is very closely balanced (i.e., it is not in the adjustment range), then all outcomes without pretests must adjust for the measure of academic achievement, and adjustment for baseline SES is not required.

References

Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher Education*, 77(5), 886–924. <http://eric.ed.gov/?id=EJ753238>.

Bailey, T., Jeong, D. W., & Cho, S.-W. (2010). Referral, enrollment, and completion in developmental education sequences in community colleges. *Economics of Education Review*, 29(2), 255–270. <http://eric.ed.gov/?id=EJ876583>.

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.

Appendix A: Literature Search Strategy²

The following terms were used to search several electronic databases:

Empirical study terms: “Control group” OR random OR “comparison group” OR regression discontinuity OR “matched group” OR baseline OR ABAB design OR treatment OR experiment OR meta analysis/meta-analysis OR evaluation OR impact OR effectiveness OR causal OR posttest/post-test OR pretest/pre-test OR QED OR single case OR RCT OR alternating treatment OR single subject OR propensity score matching

Postsecondary terms: Universit* OR “institution of higher learning” OR “community college” OR “technical college” OR “junior college” OR “institutions of higher learning” OR “community colleges” OR “technical colleges” OR “junior colleges” OR “liberal arts” OR “Historically Black Colleges and Universities” OR “Hispanic Serving Institutions” OR freshman OR freshmen OR sophomore OR junior OR senior OR first-year OR beginning

Remediation terms: developmental OR non-credit OR basic skills OR compensatory OR under achievement OR underachiev* OR remedia*

The three groups were connected by AND.

The databases searched were:

EBSCO

- Academic Search Premier
- Education Research Complete
- ERIC
- PsychInfo
- Social Science Citation Index
- Wilson Education Full Text

ProQuest

- ProQuest dissertations
- ProQuest Education journals

Appendix B.1: Supplemental Searches for Studies on Learning Communities

The following websites were searched for potentially relevant studies for the Learning Communities Intervention Report:

Center for the Study of Higher Education: <http://www.ed.psu.edu/educ/cshe>

MDRC: http://www.mdrc.org/search/publications?issue=3673&focus_area=7007#results

² The supplemental appendices will be updated as the WWC starts new reports summarizing the research on interventions for students in developmental education.

National Center for Postsecondary Research:

<http://www.postsecondaryresearch.org/index.html?Id=About&Info=Overview>

The Community College Research Center (Teachers College, Columbia University):

<http://ccrc.tc.columbia.edu/publications/designing-meaningful-developmental-reform.html>

The Washington Center: The National Resource Center for Learning Communities:

<http://www.evergreen.edu/washingtoncenter/resources/researchonlearningcommunities.html>

U.S. Department of Education, Institute of Education Sciences, National Center for Educational Research: <http://ies.ed.gov/ncer/projects/>

One book was also searched:

Taylor, K., Moore, W.S., MacGregor, J., & Lindblad, J. (2003). *Learning community research and assessment: What we know now*. National Learning Communities Project monograph. Olympia, WA: Washington Center.

Appendix B.2: Supplemental Searches for Studies on Summer Bridge Programs

The following websites were searched for potentially relevant studies for the Summer Bridge Programs Intervention Report:

Center for the Study of Higher Education

Center for the Study of Higher Education at Berkeley

CNA

Cornell Higher Education Research Institute working papers

Google Scholar

Mathematica

MDRC

National Center for Postsecondary Improvement

National Center for Postsecondary Research

NBER

RAND

Stanford Center for Education Policy Analysis (CEPA)

WISCAPE working papers

In addition, forward citation searches (using Google Scholar) were conducted for all studies identified from the larger remedial education search.