



WWC Single Study Review

A review of the design and summary of findings for an individual study



July 2015*

WWC Review of the Report “Interactive Online Learning on Campus: Testing MOOCs and Other Platforms in Hybrid Formats in the University System of Maryland”^{1,2}

The findings from this review do not reflect the full body of research evidence on interactive online learning in a hybrid format.

What is this study about?

This study measured the impact of using hybrid forms of interactive online learning in seven undergraduate courses across seven universities in the University System of Maryland. Interactive online learning can involve video lectures, opportunities for discussion and interaction with instructors and peers, and online assignments and exams. Hybrid forms of such courses combine online learning components with traditional face-to-face instruction.

Of the 1,598 students enrolled in large introductory biology, statistics, precalculus, computer science, and communications courses, 778 were enrolled in sections that used the hybrid delivery format, and 820 were enrolled in the sections that used a traditional delivery format. The hybrid delivery format entailed one of two types of technology platforms: Massive Open Online Courses (MOOCs) supported by Coursera or materials from the Open Learning Initiative (OLI) developed by Carnegie Mellon University. Five of the hybrid courses had reduced face-to-face class time, and two courses used the online materials as supplements.

The authors measured the impact of the hybrid instruction on learning outcomes (course pass rates, student grades, and on exam questions that were common across the intervention and comparison conditions), controlling for SAT scores, student

GPA, family income, and other student background characteristics. In particular, the authors examined whether the students participating in the hybrid courses performed *as well as or better than* students in traditional courses.³

WWC Rating

The research described in this report does not meet WWC group design standards

Because students were not randomly assigned to the intervention and comparison groups, and pretests on the outcomes were not available, the study needed to demonstrate equivalence on baseline measures of socioeconomic status and prior achievement to meet WWC group design standards with reservations. Baseline information on parents' income and students' high school GPA was reported in the study; however, approximately 28% of the students in the sample were missing data on parent income. As a result, the WWC was unable to assess the baseline equivalence of the analytic sample's intervention and comparison groups on this dimension. Therefore, this study does not meet WWC group design standards, and the findings are not presented in this WWC report.

What did the study find?

None of the analyses presented in this study meet WWC standards, and therefore, the study findings are not presented in this WWC report.

Features of Interactive Online Learning in Hybrid Formats

“Interactive online learning in hybrid formats” means incorporating online technology when delivering content to students.

The “hybrid format” designation encompasses any combination of face-to-face and online delivery, including supplementing face-to-face instruction with online material.

Interactive online learning programs often have features that allow teachers to collect and generate descriptive data about student learning, in particular where students may be struggling and how quickly students move through material. This data provides feedback for both students and instructors to facilitate course improvement.

The interactive online learning in hybrid formats examined in this study included math, statistics, biology, computer science, and communications.

Some of examples of the hybrid delivery used in this study included:

- Using Massively Open Online Courses (MOOCs) or materials from the Open Learning Initiative (OLI) to replace textbooks with an online version,
- Developing additional material in a MOOC to supplement in-class instruction (i.e., using a MOOC on critical reasoning to teach students how to approach a concept and evaluate information resources more analytically), and
- Enhancing an online course with video lectures or a MOOC to convey information in a particular area not in an instructor’s area of expertise.

Endnotes

* On October 22, 2015, the WWC modified this report to add information regarding the reason that this study did not meet WWC standards. Specifically, the single study review originally reported that the study did not meet WWC standards because the study authors imputed some missing pre-intervention information. However, it is more precise to state that the study does not meet WWC standards because the WWC was unable to assess the pre-intervention equivalence of the intervention and comparison groups because of the missing pre-intervention information.

¹ Griffiths, R., Chingos, M., Mulhern, C., & Spies, R. (2014). *Interactive online learning on campus: Testing MOOCs and other platforms in hybrid formats in the University System of Maryland*. New York, NY: Ithaka S+R.

² Single study reviews examine evidence published in a study (supplemented, if necessary, by information obtained directly from the authors) to assess whether the study design meets WWC design standards. The review reports the WWC's assessment of whether the study meets WWC design standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the Individual Studies in the Postsecondary Education topic area review protocol (version 3.0). A quick review of this study was released on August 11, 2014, and this report is the follow-up review that replaces that initial assessment.

³ There were two outcomes included in the study that are not described in this WWC report. The study reported qualitative findings about implementation and faculty satisfaction; however, these data were not included in the review per guidelines set forth in the WWC Procedures and Standards Handbook (version 3.0).

Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2015, July). *WWC review of the report: Interactive online learning on campus: Testing MOOCs and other platforms in hybrid formats in the University System of Maryland*. Retrieved from <http://whatworks.ed.gov>

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 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 analytic sample groups are similar on observed characteristics defined in the review area protocol.
Improvement index	Along a percentile distribution of individuals, the improvement index represents the gain or loss of the average individual due to the intervention. As the average individual 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 study participants 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 eligible study participants are randomly assigned to intervention and comparison groups.
Single-case design (SCD)	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 are 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.



Intervention
Report



Practice
Guide



Quick
Review



Single Study
Review

A **single study review** of an individual study includes the WWC's assessment of the quality of the research design and technical details about the study's design and findings.

This single study review was prepared for the WWC by Development Services Group, Inc. under contract ED-IES-12-C-0084.