Blended Learning Research Clearinghouse 1.0
May 2015

The Learning Accelerator

The Learning Accelerator is a nonprofit dedicated to transforming education by accelerating the implementation of high-quality blended learning in school districts across America. At its core, blended learning is a teaching model that combines in-person instruction and education technology that enables personalized learning and competency-based progression.

Blended learning is gaining momentum in public schools across the country, highlighting a need to better understand its effectiveness. The following report provides insight into the current body of knowledge around blended learning, including historical evidence for personalized learning and a summary of the implications of the K-12 blended learning research that has been promoted to date.

Where are we? The current body of knowledge

To date, most studies of effectiveness (defined in this resource as "improvements in intended outcomes when implemented in real life settings under ideal or routine conditions") associated with blended learning have focused on *online learning as a unique learning environment*, often in fully online or "virtual learning" settings, and/or with older adolescent or adult learners in higher education or industry settings. Because of this, there is no clear research evidence to date in public K-12 settings of the effectiveness of blended learning as an instructional model that integrates digital and face-to-face instruction in order to personalize learning and enable competency-based progression.

There is, however, an established body of evidence for personalizing or individualizing learning and facilitating student agency to foster self-regulated, intrinsically motivated learning, all of which blended learning can enable at scale. In addition, there is a growing number of studies that demonstrate that blended learning can in fact be successfully implemented in public K-12 school districts, and can be effective in meeting academic and non-academic goals for both student and teacher outcomes.

Historical Evidence for Personalized Learning

The following table highlights instructional elements of personalization that have been found to have large, positive effects on learning. As a rough guide, effect sizes of 0.5 or above are considered to be "medium" and those 0.8 or larger are considered "large." In his many meta-analyses of educational settings, professor John Hattie of University of Melbourne, Australia, suggested that an effect size of 0.4 or greater represents a "larger than average instructional effect." An effect size of 0.4 or greater is uncommon in randomized controlled studies in education, and is most likely to be found in the lower grades (K - 4). Many of these effective instructional elements are difficult to implement, scale, or sustain in traditional classrooms and are facilitated by blended learning.

INSTRUCTIONAL ELEMENT	COMMONLY STUDIED AS…	EXAMPLE EFFECT SIZE(S)
Individualized instruction[i, viii, ix]	reducing group size (to 1:1 if possible); providing instruction that is direct, explicit, and closely aligned with students' needs and prior knowledge; individualized remediation and feedback	2.0[ii] 0.82[iii] 0.65[iii]
Assessment & Feedback[i, vii, viii]	using formative assessments to inform instruction; conceptualizing assessments as learning; asking deep, explanatory questions; providing explanatory feedback that is immediate, and flows from student to teacher as well as teacher to student	1.13[iii] 0.61[iv] 0.41[iii]
Practice[v, ix]	providing opportunities and time for guided and independent practice, including homework	0.77[iv]
Promoting transfer[i, v, vi, viii]	varying the context of learning; using multiple representations of a problem and solutions, including nonlinguistic representations	0.75[iv]
Active learning[i, v, viii, ix]	facilitating self-regulated and intrinsically-motivated learning in which students have some control over and responsibility for setting and committing to relevant learning goals, pathways and pace; and are engaged in their learning	0.61[iii, iv]
Expectations[i]	setting high expectations and challenging goals for learning	0.52[iii]
Mastery-learning[v, viii, ix]	learning objectives that focus on mastery of competencies rather than recall of knowledge; scaffolded instruction in which students are engaged at their current level, and the teacher uses modeling, guided practice, and eventually independent practice to facilitate mastery; mastery-based feedback	0.5[iii]

Table Sources:

i. Alexander, P. A. & Murphy, P. K. (1998). The research base for APA's learner-centered psychological principles. In N. M. Lambert & B. L. McCombs (Eds), *How students learn: Reforming schools through learner-centered education.* (pp. 25-60). Washington, D.C.: American Psychological Association.

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iii. Hattie, J. (2003, October). *Teachers make a difference: what is the research evidence?* Paper presented at the annual meeting of Australian Council for Educational Research, Melbourne, Australia.

iv. Marzano, R. J., Pickering, D., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.

v. National Center on Universal Design for Learning (2011). *Universal Design for Learning guidelines - version 2.0: Research evidence.* Retrieved from http://www.udlcenter.org/research/researchevidence/

vi. National Research Council. (2000). *How people learn.* Retrieved from National Academy Press website: http://www.nap.edu/openbook.php?record_id=9853

vii. Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., and Metcalfe, J. (2007). *Organizing Instruction and Study to Improve Student Learning* (NCER 2007-2004). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ncer.ed.gov

viii. U.S. Department of Education, Office of Education Technology (2014). *Learning Technology Effectiveness.* Retrieved from http://tech.ed.gov/wp-content/uploads/2014/11/Learning-Technology-Effectiveness-Brief.pdf

ix. Vosniadou, S. (2001). *How children learn* (Educational practices series–7). Retrieved from UNESCO International Academy of Education, International Bureau of Education website: http://www.ibe.unesco.org/publications/EducationalPracticesSeriesPdf/prac07e.pdf

Blended Learning Research Clearinghouse

The Learning Accelerator's blended learning research clearinghouse is intended to provide a summary of the implications that can be gleaned from the K-12 blended learning research that has been promoted to date. The studies included here focus more on the effectiveness of blended learning implemented as a model or framework for improving teaching and learning, thus we have included few studies that focus on isolated elements of blended learning (such as Internet connectivity, or particular software, for example). In addition, we have included studies that are highly likely to be shared through public media or promoted as evidence for the effectiveness of blended learning.

Our goal is to provide those wishing to learn more about the evidence around blended learning with guidance on how to interpret this evidence, in order to facilitate understanding and continued measurement within the ecosystem. Our intent is for this to be a living and growing resource, therefore we will augment this clearinghouse over time as more measurement work is published.

About the Studies

The studies included here represent a range of research designs, and therefore a range of "research rigor." Because of this, not all of the findings are broadly applicable to all situations, and not all of the designs used can support "causal inferencing" (the reasoning that any of the reported findings or effects were caused by the program or intervention that was studied). In order to help readers more fully understand the implications of these different types of studies to their own context, we have included three indicators along with the descriptions of each study's implications - as described below:

"STUDY TYPE" refers to the underlying research design that was used in the study, and indicates the rigor of this design in supporting causal claims. Research design is also related to the likelihood of replicating the study's results with a different sample of participants (discussed in more detail below). In order of rigor, from most rigorous to least, the study types used in the clearinghouse are: meta-analysis, synthesis, randomized control trial, regression discontinuity, matched-group, norm-group, repeated measures, and descriptive. It should be noted that descriptive studies contain no statistical comparisons, and so do not at all support any degree of causal claims. Not all of these study types are currently represented in the clearinghouse.

Descriptive	Repeated measures	Norm-group	Matched-group	Regression discontinuity	Randomized control trial	Synthesis	Meta-analysis
1	2	3	4	5	6	7	8

"LIKELIHOOD OF REPLICATING RESULTS" refers to the strength of the research design in supporting the idea that the intervention described in the study "caused" the findings that were reported. Another way of thinking about "causality" is the likelihood that another team conducting the same study would find the same results (or the likelihood that the findings in the study were due to real differences in outcomes, rather than just chance). For more rigorous studies, the likelihood of replicating the results, or the likelihood that the intervention caused the findings, is high. For less rigorous studies, this likelihood is lower (which in this case simply means that if others implement blended learning as defined by the authors, there is a greater risk that implementation will not exhibit similar success as in the study.)

N/A	UNKNOWN LIKELIHOOD OF REPLICATION	SOME LIKELIHOOD OF REPLICATION	HIGH LIKELIHOOD OF REPLICATION

"ALIGNMENT" refers to the extent to which blended learning as described by the authors of the study was implemented as a model/framework for improving teaching and learning, with sufficient detail that anyone who read the study could replicate implementation. Knowing specifically what was being investigated in a study and how similar it is to what you are considering or currently implementing is another important factor in determining how applicable those findings are to your own situation or context.

Studies that do not include such descriptions of their implementation would be classified as having "low alignment of studied intervention to blended learning as an instructional model," simply because a reader would be unable to replicate implementation, or know how similar the intervention was to their own model, without having to seek more information from the authors. Other studies would be classified as having "low alignment..." if they focused on an isolated aspect of blended learning, rather than the broader model or framework.
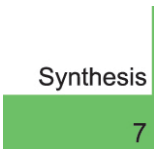
LOW ALIGNMENT	MEDIUM ALIGNMENT	HIGH ALIGNMENT
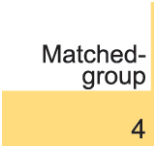
PUBLICATION TITLE	QR CODE
EVALUATION OF EVIDENCE-BASED PRACTICES IN ONLINE LEARNING: A META-ANALYSIS AND REVIEW OF ONLINE LEARNING STUDIES	

YEAR	AUTHOR	ORGANIZATION
2010	Barbara Means, Yukie Toyama, Robert Murphy, Marianne Bakia, Karla Jones	Center for Technology in Learning (at SRI)

STUDY TYPE	LIKELIHOOD OF REPLICATION	ALIGNMENT
Meta-analysis 8	R R R	A A

IMPLICATIONS

This meta-analysis provides evidence that more learning took place in online settings than face-to-face settings, with the most learning occurring in blended (both online and face-to-face) settings.

However, the studies analyzed here included mostly adult learning contexts, with only five studies in K-12 settings being rigorous enough to be included. Therefore, it is unknown how applicable these findings are to K-12 in general, and there is also no way to tease apart whether these differences were due to the setting alone, or differences in curriculum materials, instructional practices, and learning time, which varied from study to study and were unmeasured.

PUBLICATION TITLE
HANDBOOK OF RESEARCH ON K-12 ONLINE AND BLENDED LEARNING

YEAR
2014

EDITOR
Richard E. Ferdig, Kathryn Kennedy

ORGANIZATION
Research Center for Educational Technology, Kent State University & MVU, Michigan Virtual Learning Research Institute

STUDY TYPE

Synthesis

7

LIKELIHOOD OF REPLICATION

R R R

ALIGNMENT

A A

IMPLICATIONS

The goal of this handbook is to investigate the conditions under which online and blended learning can occur, so it is not surprising that, across the broad array of K-12 research considered here, the little evidence that exists does not support the idea that more learning occurs in online settings when compared to face-to-face settings.

However, this handbook does describe some of the conditions under which blended and online learning have been implemented with success and, perhaps more importantly, illustrates the need to conduct more research to better understand the instructional practices that occur in blended and traditional learning environments, the similarities and differences between practices that occur in the different learning environments, and whether or not each environment better facilitates any of the instructional practices that we already know to be effective in improving learning.

Each chapter also provides clear suggestions for future research and what approaches to research should be considered.

PUBLICATION TITLE
BLENDED LEARNING REPORT

STUDY TYPE

Matched-group
4

LIKELIHOOD OF REPLICATION

R R R

ALIGNMENT

A A

IMPLICATIONS

In this report, different outcomes and study designs were (appropriately) used for different comparisons. Even so, each of the included studies had similar limitations, namely, that not enough is known about the comparison groups to know if any of the findings were specifically linked to blended learning implementation. Overall, the findings were mixed, and so did not provide consistent evidence to support the effectiveness of blended learning implementation in improving students' reading, English language arts, nor mathematics scores.

That being said, the qualitative findings can be used to generate future hypotheses and guide future research, as they shed light on the aspects of implementation that may be related to some of the academic outcomes (especially the negative outcomes) reported in these studies.

PUBLICATION TITLE

EARLY PROGRESS: INTERIM RESEARCH ON PERSONALIZED LEARNING

QR CODE

YEAR
2014

ORGANIZATION
RAND Corporation & the Bill and Melinda Gates Foundation

STUDY TYPE

Matched-group

4

LIKELIHOOD OF REPLICATION

R R R

ALIGNMENT

A A

IMPLICATIONS

This study evaluates schools implementing personalized learning by examining learning growth on the NWEA Measures of Academic Progress. The study uses a virtual comparison group of students from schools using the same assessment and serving similar student populations.

The researchers mention several limitations of the study, including the assumptions that:

(1) the comparison schools are not implementing personalized learning, and that

(2) there were no other (unobserved) differences between the personalized learning and comparison groups.

If these assumptions did not hold, the study results could have been biased upward or downward.

Even if these assumptions held, however, still more work would need to be done to establish which personalized learning practices were driving the effects found in the study. The authors suggest that future reports from the project may include analyses that help to address some of the limitations of this preliminary report.

PUBLICATION TITLE

PROOF POINTS: BLENDED LEARNING SUCCESS IN SCHOOL DISTRICTS

QR CODE

YEAR
2015

ORGANIZATION
Evergreen Education Group & Clayton Christensen Institute

STUDY TYPE

Descriptive

1

LIKELIHOOD OF REPLICATION

R R R

ALIGNMENT

A A

IMPLICATIONS

This series of two-page profiles provides examples of blended learning implementations in non-charter, public schools considered successful by the school or district in meeting measurable objectives related to student academic outcomes as determined by the districts. In addition, common traits across the group of districts are summarized on the landing page for the profiles.

Multiple models of blended learning are included and described in the profiles, as are specific measurable objectives for pursuing implementation, and specific practices that were implemented in each district.

Readers are also provided with details about the district itself (including performance before and after implementation) so that judgments can be made about the similarity between the different districts profiled here, as well as the reader's own district if applicable.

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PUBLICATION TITLE	QR CODE
TRANSFORMING EDUCATION THROUGH DIGITAL AND BLENDED LEARNING	

YEAR	AUTHOR	ORGANIZATION
2015	Don Soifer	Lexington Institute

STUDY TYPE	LIKELIHOOD OF REPLICATION	ALIGNMENT
Descriptive 1	R R R	A A

IMPLICATIONS

This report provides a summary of best practices based on examples of successful implementations of blended learning across the country, along with theory-based discussions of lessons learned and areas where successes and challenges are likely to occur.

These recommendations could provide practical support to those just beginning to implement blended learning who are looking for information from others who have found success in their own implementation of blended learning, and have developed solutions to common implementation challenges.

PUBLICATION TITLE	QR CODE
HYBRID LEARNING PROGRAM RESULTS: SUMMARY REPORT FOR ACADEMIC YEAR 2013-2014 **ACADEMIC YEAR: 2013-2014 PROGRAM RESULTS**	

YEAR
2014

ORGANIZATION
Dellicker Strategies, LLC

STUDY TYPE

Descriptive
1

LIKELIHOOD OF REPLICATION

R R R

ALIGNMENT

A A

IMPLICATIONS

The first (summary) report provides examples of implementation in which hybrid learning was considered successful across multiple public districts in meeting academic and non-academic objectives for the districts that were implementing hybrid learning with fidelity as determined by the authors.

The second, more detailed, report contains information about the methodology used to determine the summary results in the first report. Hybrid learning is clearly defined by six practices, and 10 operational objectives that were measured and used to determine implementation fidelity. Comparison (non-hybrid) schools were also included where possible to contextualize findings.

These results, although descriptive, can be helpful to those interested in implementing blended learning models in similar districts and schools to the ones detailed here, in order to meet similar objectives to the ones described in these reports.

PUBLICATION TITLE	QR CODE
STUDENT MATHEMATICS PERFORMANCE IN THE FIRST TWO YEARS OF TEACH TO ONE: MATH	

YEAR	AUTHOR	ORGANIZATION
2014	Douglas D. Ready, Ph.D.	Teachers College, Columbia University

STUDY TYPE	LIKELIHOOD OF REPLICATION	ALIGNMENT
Norm-group 3	R R R	A A

IMPLICATIONS

The goal of this widely-publicized report was not to provide causal estimates (i.e., the research questions did not focus on causal links or evidence of effectiveness). Further, the study focused specifically on the New Classrooms/Teach to One program, rather than blended learning in general. (A current study is focused on identifying causal links between Teach to One and students' algebra outcomes - no findings have been reported from this ongoing study yet.)

Nonetheless, the findings from the 2014 study have been reported through multiple outlets as evidence both for and against the effectiveness of blended learning, thus its inclusion here is intended to clarify its implications.

Overall, these findings do not apply to understanding the effectiveness of blended learning as an instructional model, although they do suggest that the Teach to One program itself has promise, as results were rather mixed across grade levels and years.

Future Work

More research is needed in order to answer the underlying question of whether blended learning "works" or not. Some argue that the more interesting research question is "for whom, and under what conditions" does blended learning work. Regardless of the core research question being pursued, future studies would benefit from measuring the instructional and pedagogical aspects of both blended and comparison (usually traditional, or face-to-face) learning environments, so that findings can be linked to specific instructional practices and conditions.

The Learning Accelerator is partnering with others to further progress in this direction by creating a shared learning and research agenda to guide our collective measurement work across the sector. As more research is conducted, we will also continue to summarize, translate, and disseminate what is known about the effectiveness of blended learning - through updates to resources like this one, as well as the creation of additional resources to advance the measurement of blended learning across the nation.

The Blended Learning Research Clearinghouse
1.0 was compiled by TLA Partner
Saro Mohammed.

If you know of studies or reports that could be
included in future versions of this resource,
please contact Saro at
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For more information about The Learning
Accelerator, please visit
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