Online Learning vs. Traditional Learning;
A Quick Overview of Research Findings
(S.M. Kosslyn, 15 March 2020)

Twenty Years of Research on the Academic Performance Differences Between Traditional and Distance Learning: Summative Meta-Analysis and Trend Examination
Mickey Shachar and Yoram Neumann
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This meta-analysis research estimated and compared the differences between the academic performance of students enrolled in distance education courses, relative to those enrolled in traditional settings, as demonstrated by their final course grades/scores, within the last twenty year (1990-2009) period, further broken down to four distinct subperiods. A large k=125 of experimental and quasi-experimental studies met the established inclusion criteria for the meta-analysis (including data from over 20,000 participating students), and provided effect sizes, clearly demonstrating that: (1) In 70% of the cases, students taking courses by distance education outperformed their student counterparts in the traditionally instructed courses; (2) The overall effect size 'd+' (random method) was calculated as 0.257 (0.17< 95% CI

Differences Between Traditional and Distance Education Academic Performances: A Meta-Analytic Approach. Shachar, M., & Neumann, Y. (2003). *The International Review of Research in Open and Distributed Learning*, *4*(2). https://doi.org/10.19173/irrodl.v4i2.153

This meta-analysis research estimated and compared the differences between the academic performance of students enrolled in distance education courses relative to those enrolled in traditional settings, as demonstrated by their final course grades/ scores within the 1990-2002 period. Eighty-six experimental and quasi-experimental studies met the established inclusion criteria for the meta-analysis (including data from over 15,000 participating students), and provided effect sizes, clearly demonstrating that: (1) in two thirds of the cases, students taking courses by distance education outperformed their student counterparts enrolled in traditionally instructed courses; (2) the overall effect size d+ was calculated as 0.37 standard deviation units (0.33 < 95% confidence interval < 0.40); and (3) this effect size of 0.37 indicates the mean percentile standing of the DE group is at the 65th percentile of the traditional group (mean defined as the 50th percentile).

The Effectiveness of Online Learning: Beyond No Significant Difference and Future Horizons
Tuan Nguyen
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This study examines the evidence of the effectiveness of online learning by organizing and summarizing the findings and challenges of online learning into positive, negative, mixed, and

null findings. Particular attention is paid to the meta-analyses on the effectiveness of online learning, the heterogenous outcomes of student learning and the endogenous issue of learning environment choice. Taken as a whole, there is robust evidence to suggest online learning is generally at least as effective as the traditional format.

Learning Outcomes in an online vs traditional course, steven_stack@hotmail.com International Journal for the Scholarship of Teaching and Learning, January 2015, 1, 1.

While two recent Meta analyses report higher exam grades for online vs. traditional classes, this body of research has been marked by two recurrent limitations: (1) a possible problem of selection bias wherein students self select the mode of course delivery and (2) a relative lack of proctoring of exams in online sections. Both of these confounders contribute to observed differences in performance. The present study addresses these limitations. Data refer to 64 students enrolled in criminology classes at a Carnegie research extensive university. Due to an administrative error in the course schedule, which failed to list one section as online, students were unable to self select into the online section, creating a rare opportunity for quasi randomization of students into sections. Both sections were taught by the same instructor. The dependent variable is the score on the standardized final examination. All exams were proctored by the instructor. The central independent variable is method of delivery of content: online vs. the traditional classroom. Controlling for other constructs, there was no significant difference between exam scores. Also, student evaluations did not differ between sections. Controlling for selection effects and the proctoring of exams, the academic performance of online students was the same as that of traditional students. Future work is needed for other courses, other fields, and other types of academic institutions.

How Online Learning Compares to the Traditional Classroom Measuring Accounting Course Outcomes. Keith T. Jones, and Keith Moreland . CPA Journal. September 2017. https://www.cpajournal.com/2017/10/09/online-learning-compares-traditional-classroom/

As the popularity of online instruction spreads, many have questioned whether the method produces similar outcomes to the traditional classroom. The authors surveyed both kinds of students, and the results indicate that a student's ability to work in an intentional and motivated manner, and the greater cognitive effort that results, carries more weight than does the course delivery method and may also translate into a more positive evaluation of the course.

https://potomac.edu/learning/online-learning-vs-traditional-learning/

Online learners score on standardized tests
- The average score of classroom learners: 50th percentile

- The average score of online learners: 59th percentile
- There is a 5:1 ratio by which learners differ
- A 5:1 ratio by which learners differ means that the slowest student takes 5 times as long to learn as the fastest student.
- 90% of these learners will successfully reach higher levels, but only if given enough attention.
- Face-to-face instruction is the best approach to providing these levels of attention.

A Comparison of Student Learning Outcomes in Traditional and Online Personal Finance Courses Eddie J. Ary, Frank D. Hickingbotham and Christopher W. Brune

Numerous studies have compared student outcomes in online classes and traditional classes, but with mixed results. This paper adds to the existing body of evidence through an examination of students in Personal Finance courses. Primary results indicate that the delivery method made little difference in student performance. Secondary results identify pre-course GPAs, and to a lesser extent ACT scores, as predictors of student success in Personal Finance.

Comparison of Student Learning Outcomes in Online and Traditional Classroom Environments in a Psychology Course

Jennifer Lyke and Michael Frank

Promoting distance education is an important policy on many college campuses, so evaluating to what extent online learning environment may affect learning outcomes and/or student satisfaction should continue to be a research priority. This study investigated whether students in an online class performed differently than students in a traditional classroom setting on weekly quizzes, and whether their satisfaction with the course and instructor differed from students in a traditional classroom setting. Participants were two classes of students ($N = 69$) in Theories of Counseling. Results indicated no difference between the scores of the two groups on the weekly quizzes, but students in the online class were less satisfied with the course and instructor overall. These findings support other research indicating students may perform as well in an online environment as their counterparts in a traditional classroom, but their satisfaction with the educational experience may suffer.

However, a caveat: As far as I can tell, this is all from asynchronous online learning. Synchronous should be even better because it affords the use of active learning, which is without question more effective than passive learning. For example, the now-classic meta-analysis.

To test the hypothesis that lecturing maximizes learning and course performance, we metaanalyzed 225 studies that reported data on examination scores or failure rates when comparing student performance in undergraduate science, technology, engineering, and mathematics (STEM) courses under traditional lecturing versus active learning. The effect sizes indicate that on average, student performance on examinations and concept inventories increased by 0.47 SDs under active learning (n = 158 studies), and that the odds ratio for failing was 1.95 under traditional lecturing (n = 67 studies). These results indicate that average examination scores improved by about 6% in active learning sections, and that students in classes with traditional lecturing were 1.5 times more likely to fail than were students in classes with active learning. Heterogeneity analyses indicated that both results hold across the STEM disciplines, that active learning increases scores on concept inventories more than on course examinations, and that active learning appears effective across all class sizes—although the greatest effects are in small (n ≤ 50) classes. Trim and fill analyses and fail-safe n calculations suggest that the results are not due to publication bias. The results also appear robust to variation in the methodological rigor of the included studies, based on the quality of controls over student quality and instructor identity. This is the largest and most comprehensive metaanalysis of undergraduate STEM education published to date. The results raise questions about the continued use of traditional lecturing as a control in research studies, and support active learning as the preferred, empirically validated teaching practice in regular classrooms.