Research into K-12 Online Learning

Most research comparing student performance between online and face-to-face environments has found little difference in that performance. However, much of this **research has been methodologically flawed or used samples that were skewed in favor of the online students**.

Study	Finding	Problem
Ballas & Belyk (2000)	Alberta (Canada) - performed similar in English and Social Studies - classroom students performed better in all other subject areas	Participation rate in the assessment among virtual students ranged from 65% to 75% compared to 90% to 96% for the classroom-based students
Bigbie & McCarroll (2000)	Florida - >50% of students got A - only 7% failed	Between 25% and 50% of students had dropped out over the previous two-year period
Barker & Wendel (2001)	Three Canadian Provinces - virtual students performed no worse than the students from conventional schools	Readers cautioned about inconsistency in the reporting of virtual school results from school-to-school and province-to-province
Cavanaugh et al. (2005)	Florida - online better	Online students were more academically motivated and naturally higher achieving students
McLeod et al. (2005)	Florida - online better in algebra	Online class had a much higher dropout rate
Barbour & Mulcahy (2008)	Newfoundland (Canada) - little difference in students performance based on delivery model	Speculated sample was skewed in favor of the K-12 online learning students
Barbour & Mulcahy (2009)	Newfoundland (Canada) - no difference in student performance based on method of course delivery	Speculated weaker students may have been self-selecting a less rigorous curriculum in order to avoid taking online courses

K-12 online learning research has been **skewed towards a selective student** in general**.**

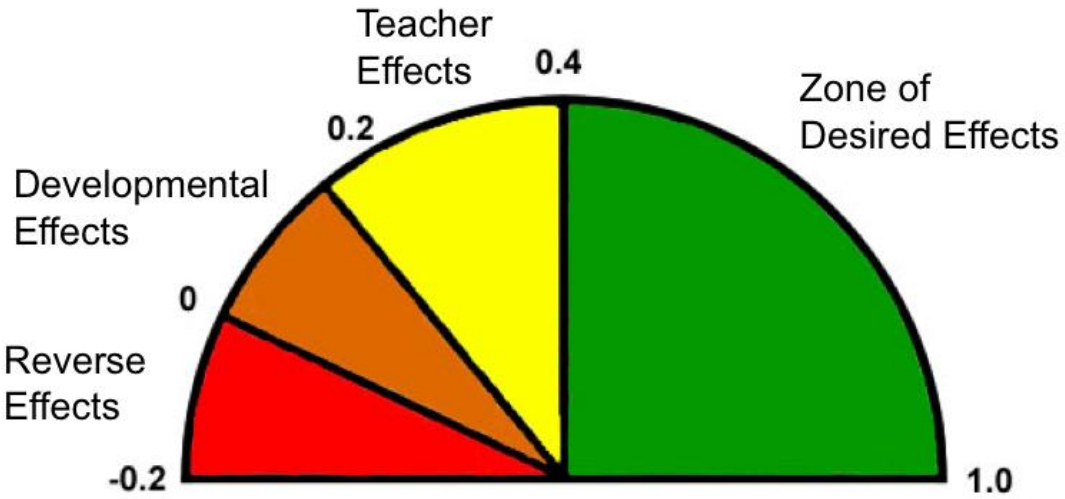
Study	Sample
Kozma et al. (1998)	**vast majority** of online students were **planning to attend a four-year college**
Espinoza et al. (1999)	students enrolled are **mostly college bound**
Haughey & Muirhead (1999)	preferred characteristics include the **highly motivated, self-directed, self-disciplined, independent learner who could read and write well, and who also had a strong interest in or ability with technology**
Roblyer & Elbaum (2000)	only students with a **high need to control and structure their own learning** may choose distance formats freely
Clark et al. (2002)	online students were **highly motivated, high achieving, self-directed and/or who liked to work independently**
Mills (2003)	typical online student was an **A or B student**
Watkins (2005)	**45% of the students** who participated in online learning in Michigan were **either advanced placement or academically advanced**

Even the meta-analysis comparing K-12 student performance in the online learning environment has been **suspect, misunderstood and misused by K-12 online learning proponents**.

Study	Finding	Problem
Cavanaugh (2001)	Meta-analysis of 16 studies - **+0.147** in favor of K-12 distance education - small positive effect size in favor of online	Studies varied in distance education format and amount of actual "distance" instruction
Cavanaugh et al. (2004)	Meta-analysis of 14 studies - **-0.028** for K-12 distance education - small negative effect size for online students	Stated decreased performance was due to wider range of students in online learning
Means et al. (2009)	Meta-analysis of 5 studies - effect sizes ranged from **-0.24** to **+0.74** (overall K-12 effect size not provided) - small positive effect size in favor of online for all 51 studies (**+0.14**)	Caution is required in generalizing to the K–12 population because the results are derived for the most part from studies in other settings

Hattie (2009; Hattie & Marsh, 1996; 2006) conducted a study of over 800 meta-analysis studies representing more than 50,000 individual studies and millions of students over a 15-year period.

- 90% of all effect sizes in education are positive, setting the bar at 0.00 would be trivial
- students should increase in achievement +0.15 effect size simply from the developmental effects over a year (i.e., a year older and a year wiser)
- an average teacher should have a +0.25 effect size increase on student achievement over the course of a school year
- **innovations that have an effect size of +0.40 are those that can enhance student achievement in such a way that we can notice real-world change**



None of this research included any full-time online students!

State of California – 2003 RAND Education study for the California Legislature Analyst's Office

- "Charters that offer nonclassroom-based instruction have **much lower adjusted test scores** than either other charter schools or conventional public schools."
- "…it is evident that the **poor test results for students** in nonclassroom-based charter schools pull down the average performance of students in charter schools…"
- "…we found that nonclassroom-based schools performed **significantly lower** than conventional public schools…"

State of Colorado – 2006 Online Education Performance Audit

- "Online student **scores in math, reading, and writing have been lower** than scores for students statewide over the last three years."
- "The **difference in performance** between online students and all students statewide is **larger in higher grades**."
- "Our analysis of Colorado Student Assessment Program results and repeater, attrition, and dropout rates indicate that online schools **may not be providing sufficiently** for the needs of their students."

State of Ohio – 2009 RAND Education study

- "The estimates for the virtual charter schools are **negative, substantial, and (in three of four estimates) statistically significant**."
- "Virtual charter middle schools **lag substantially behind** classroom-based charter middle schools…"
- "…we found that nonclassroom-based schools performed **significantly lower** than conventional public schools…"

State of Wisconsin – Legislative Audit of Virtual Charter Schools (2010)

- "In all three years [i.e., 2005-06, 2006-07, and 2007-08] virtual charter school pupils in all grade levels [i.e., grades 3-10] had higher median scores on the reading section of the Wisconsin Knowledge and Concepts Examination than the statewide median."
- "Virtual charter school pupils' median scores on the mathematics section of the Wisconsin Knowledge and Concepts Examination were **almost always lower than statewide medians** during the 2005-06 and 2006-07 school years. However, in the 2007-08 school year, virtual charter school pupils in grades 4 through 7 had higher median scores," approximately the same median scores in grades 8 through 9, and lower median scores in grade 10.

Virtual Charter Schools Nationally – National Education Policy Center (2011)

- "The AYP ratings for virtual schools managed by EMOs were **substantially weaker** than the ratings for the brick-and-mortar schools. While only 27.4% of the virtual schools operated by for-profit EMOs met AYP, 51.8% of the brick-and-mortar schools met AYP."

State of Arizona – Ryman and Kossan Investigation (2011)

- "The largest online schools in K-12 **lag the state averages** among all Arizona public schools in most standardized test scores and in graduation rates."
- "…the state's largest online schools are **failing to retain many students**."
- "Some of the largest schools have **below-average scores** on the AIMS test. **Graduation rates tend to be lower**."
- "…all had graduation rates and AIMS math passing rates **below the state average**."

State of Colorado – iNews Network Investigation (2011)

Using DOE data for 10,500 students enrolled in the 10 largest online schools from 2008-10.

- "Half of the online students **wind up leaving** within a year. When they do, they're **often further behind academically** then when they started."
- "Online schools produce **three times as many dropouts as they do graduates.** One of every eight online students drops out of school permanently – a rate **four times the state average**."
- "Online student scores on statewide achievement tests are consistently **14 to 26 percentage points below state averages** for reading, writing and math over the past four years."

State of Ohio – 2011 Innovation Ohio study

- "Of the **23 E-schools** rated by the Ohio Department of Education for the 2009-2010 school year, **only three rated "effective" or better** on the state report card."
- "…**only two of the seven statewide E-schools**–schools whose students come from all over the state and account for about 90 percent of all E-school enrollment–**have graduation rates higher than** Cleveland Municipal Schools, **the lowest rate of all traditional school districts** in Ohio."
- "On the state's Performance Index Score, nearly **97 percent of Ohio's traditional school districts have a higher score than the average score of the seven statewide E-schools**."

State of Minnesota – 2011 K-12 Online Learning Legislative Audit

- "Full-time online students **dropped out much more** frequently."
- "Compared with all students statewide, full-time online students had **significantly lower proficiency rates on the math** MCA-II but similar proficiency rates in reading."
- "During both years [i.e., 2008-09 and 2009-10], full-time online students enrolled in grades 4 through 8 made about **half as much progress in math**, on average, as other students in the same grade."

K12, Inc's Virtual Charter Schools Nationally – National Education Policy Center (2012)

- "While the performance of K12 schools on the AYP measure **is poor**, it is important to note that other EMOs that operate virtual schools have **similarly weak perfo**rmance levels…"
- "…there are now more AYP ratings available for K12 schools and we have **adjusted the AYP rate for K12 schools downwards** to 27.7% which is almost identical to the average for all EMO-operated virtual schools (27.4%)."
- "The AYP ratings for virtual schools managed by EMOs were **substantially weaker** than the ratings for the brick-and-mortar schools."
- "After seeing the surprisingly low AYP ratings for K12 and other virtual schools, and after noticing that these schools did not appear to serve more disadvantaged students than local district schools, we hypothesized that K12 schools may not be meeting AYP due to **falling short of the test-taking rate** mandated by NCLB."
- "At the same time, we found that in all but a few cases, the insufficient proportion of the students taking the test **still did not meet state standards**."
- "Of the 36 K12 Inc. schools that had been assigned a school rating by state education authorities, **only seven** (19.4%) **of these schools had ratings that clearly indicated satisfactory status**."
- "Across grades 3-11, the K12 schools were **between 5 and 12 percentage points behind the state average** in reading…"
- "…the gap between K12 schools and the states is **substantially larger** for math than it was for reading. Also noteworthy is that this **gap in performance increases dramatically** over the grades."
- "…the on-time graduation rates for the K12 schools is just **below 50%**. The weighted mean for the states was 79.4%."
- "From this evidence it was clear that, regardless of whether the virtual school was operated by a for-profit EMO or a district, there were likely to be **high levels of student attrition**."

There is only one study to find favorable results for full-time K-12 online learning studies.

University of Arkansas Internal Evaluation of the Arkansas Virtual Academy School (ARVA)
There were methodological limitations in the sample (all of which favored the online students):

- the online **sample had several of its lowest performing students** removed before they had repeated a grade or had dropped out over the two-year period.
- the online **sample was a more affluent group**.
- the online **sample had significant fewer minority students**.

When comparing student performance in mathematics, the researchers found:

- students in the face-to-face group increased their performance by 1% more than the online group from grades 3 to 5 (not statistically significant)
- students in the online group increased their performance by 5% more than the face-to-face group from grades 4 to 6 (not statistically significant)
- students in the online group increased their performance by 2% more than the face-to-face group from grades 5 to 7 (not statistically significant)

- students in the online group increased their performance by 16% more than the face-to-face group from grades 6 to 8 (statistically significant at the *p*=0.10 level)

When comparing student performance in literacy, the researchers found:

- students in the face-to-face group increased their performance by 3% more than the online group from grades 3 to 5 (not statistically significant)
- students in the online group increased their performance by 11% more than the face-to-face group from grades 4 to 6 (statistically significant at the *p*=0.10 level)
- students in the online group increased their performance by 2% more than the face-to-face group from grades 5 to 7 (not statistically significant)
- students in the online group increased their performance by 7% more than the face-to-face group from grades 6 to 8 (not statistically significant)

The online students – who were already a higher achieving, more affluent, and more Caucasian group of students – only outperformed the face-to-face students in mathematics in the grade 6-8 cohort and in literacy in the grade 4-6 cohort. In all other areas they had statistically similar levels of performance.

However, typically speaking when researchers are comparing means they tend to use an alpha level (or *p*) of 0.05 as the standard level for statistical significance. The alpha level is essentially the possibility that the results were due to chance or luck. An alpha level of 0.05 means that there is a 5% chance that the results were due to luck and a 95% chance that the results were due to the actual treatment involved (in this case the full-time online learning offered). The researchers in this study choose to use a higher alpha level of 0.10, meaning there was a 10% or one in ten chance that their results had nothing to do with the online learning and were based simple on chance. The researchers also did not provide the actual result of the regression analysis, so we are unable to tell if the result would have been statistically significant at the standard 0.05 level or the more cautious 0.01 level (as 0.01 is often used when an innovation is untested).

Summary

From the available research to date, we cannot say that supplement K-12 online learning is any better or any worse than face-to-face learning because there have been too many methodological issues that have the potential to skew the data (generally in favor of the K-12 online learning sample). We can say that based on the available evidence that we have to date, full-time K-12 online learning does not achieve the same results as face-to-face learning (at least using the same measures we judge our traditional brick-and-mortar schools).

We can also say that students who have the characteristics that would pre-dispose them to having success, will likely have success regardless of the environment in which they are studying.

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