Problem and Project-Based Learning Effect on Standardized Testing

Boss, S., Johanson, C., Arnold, S. D., Parker, W. C., Nguyen, D., Mosborg, S., Nolen, S., Valencia, S., Vye, N., & Bransford, J. (2011). The Quest for Deeper Learning and Engagement in Advanced High School Courses. *The Foundation Review*.

Multi-year study comparing the efficacy of PBL education on AP classes for 378 high school students. PBL-AP students. "PBL-AP students performed better to a statistically significant degree on the measure than students in traditional (control) AP classes." [link]

Condliffe, B., Quint, J., Visher, M., Bangser, M., Drohojowska, S., Larissa, S., & Nelson, E. (2017). Project-Based Learning: A Literature Review. *MDRC*.

Reviews the design principles, approaches, and outcomes of project-based learning in k-12 education between the years of 2000 to 2017. Authors argue more rigorous research needs to be conducted with math and language arts, especially since recent studies have been mostly for social studies and the sciences. [link]

Duke, N., Halvorsen, A., Strachan, S., Kim, J., & Konstantopoulos, S. (2021). "Putting PjBL to the Test: The Impact of Project-Based Learning on Second Graders' Social Studies and Literacy Learning and Motivation in Low-SES School Settings. *American Educational Research Journal*.

24 teachers that engage with Project PLACE (Project-approach to Literacy and Civic Engagement) were compared to non-PBL methods through unofficial tests that were closely aligned with State and National learning standards. The PBL group had 63% gain in social studies as compared to the non-PBL group. There was also a 23% gain in informational reading, but this was not the case for informational writing or motivation. [link]

Finkelstein, N., Hanson, T., Huang, C., Hirschman, B., & Huang, M. (2010). Effects of Problem Based Economics on high school economics instruction. *Institute of Education Sciences*.

Students in grades 11 & 12 whose teachers had received professional development and support in Problem Based Economics outscored the control group on the Test of Economic Literacy (a 40-item standardized test developed by the NCEE) by 2.60 items. [link]

Geier, R., Blumenfeld, P., Marx, R., Krajcik, J., Fishman, B., Soloway, E., & Clay-Chambers, J. (2004). Standardized Test Outcomes for Students Engaged in Inquiry-Based Science Curricula in the Context of Urban Reform. *Buck Institute for Education*.

Hundreds of 7th and 8th grade students in Detroit Public Schools were taught with one or more project-based science curriculum units developed by The Center for Learning Technologies in Urban Schools (LeTUS). In both cohorts, students on average scored better on the standardized MEAP science test. [link]

Hixson, N., Ravitz, J., & Whisman A. (2012). Extended Professional Development in Project-Based Learning: Impacts on 21st Century Teaching and Student Achievement. *West Virginia Department of Education*.

24 teachers were given PBL training at TLI by Buck Institute for Education (BIE) and applied these teachings in the Spring Semester of 2011. Results of the WESTEST 2 achievement gains in English/language arts, mathematics, science, and social studies were as strong as students from non-PBL-using teachers. [link]

Holthuis, N., Deutscher R., Schultz S., & Jamshidi A. (2018). The New NGSS Classroom: A curriculum Framework or Project-Based Learning. *American Educator*.

A three-year study with standardized testing in math, English/language arts, and science. Students taught through LTP, a PBL science program that also extends to literacy and mathematics, showed significant improvements in all three areas of content. [link]

Kingston, S. (2018). Project Based Learning & Student Achievement: What Does the Research Tell Us? PBL Evidence Matters. *Buck Institute for Education*.

Analyzes 4 different literature reviews and highlights 20 studies from a span of 1984 to 2017. These studies demonstrate the efficacy of Project Based Learning in the following content areas: social studies (9), science (8), math (2), and Language Arts (1). [link]

Krajcik, J., Schneider B., Miller, E., Chen I., Bradford L., Bartz, K., Baker, Q., Palinscar, A., Peek-Brown, D., & Codere, S. (2021). Assessing the Effect of Project-Based Learning on Science Learning in Elementary Schools. *George Lucas Educational Foundation*.

Over 1,000 third grade students were taught through Multiple Literacies in Project-Based Learning (ML-PBL). ML-PBL students scored an average of 8 percentage points better on a test aligned closely with the third-grade NGSS performance standards. [link]

Project-Based Learning Boosts Student Achievement in AP Courses. *George Lucas Education Foundation*.

Research Review of "Knowledge in Action Efficacy Study Over Two Years" (Saavedra et al. 2021). [link]

Project-Based Learning Increases Science Achievement in Elementary School and Advances Social and Emotional Learning. *George Lucas Education Foundation*.

Research Review of "Assessing the Effect of Project-Based Learning on Science Learning in Elementary Schools" (Krajcik et al., 2021). [link]

Project-Based Learning Leads to Gains in Science and Other Subjects in Middle School and Benefits All Learners. *George Lucas Education Foundation*.

Research Review of "The New NGSS Classroom: A curriculum Framework or Project-Based Learning" (Holthuis et al., 2018). [link]

Saavedra, A., Liu, Y., Haderlein, S. (2021). Knowledge in Action Efficacy Study Over Two Years." *Center for Economic and Social Research*.

Both years of teaching with KIA (Knowledge in Action), a project-based learning approach, produced increased likelihoods in passing both AP Environmental Science and AP US Government. Students of teachers in the second year of using this curriculum had a 10-percentage point increase in the probability of earning a passing AP Exam score. [link]

Vega, V. (2015) Project-Based Learning Research: Annotated Bibliography. *Edutopia*.

Annotated bibliography includes over 40 sources relating to project-based learning. Many of them are not based on standardized testing evidence, though all findings support a more interactive and thoughtful education. [link]