

Homework

High impact for very low cost based on very limited evidence

Homework refers to tasks given to pupils by their teachers to be completed outside of usual lessons.

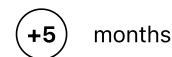
Implementation cost



Evidence strength



Impact (months)



Subject breakdown

maths: 26
reading: 5
science: 7
toolkit: 44

School phase breakdown

primary: 11
secondary: 33
toolkit: 44

Technical Appendix

The criteria used to judge the inclusion of studies in the Toolkit are:







- The population sampled involved early years and school age learners from 3-18 learning in their first language.
- The intervention or approach being tested was educational in nature, including named or clearly defined programmes and recognisable approaches classifiable according to the Toolkit strand definitions (e.g. peer tutoring or small group teaching). The intervention or approach is undertaken in a normal educational setting or environment for the learners involved, such as a nursery or school or a typical setting (e.g. an outdoor field centre or museum).
- A valid comparison was made between those receiving the educational intervention or approach and those not receiving it.
- Outcomes include the assessment of educational or cognitive achievement which reports quantitative results from testing of attainment or learning outcomes, such as by standardised tests or other appropriate curriculum assessments or school examinations or appropriate cognitive measures.
- The study design provided a quantitative estimate of the impact of the intervention or approach on the educational attainment of the sample, calculated or estimated in the form of an effect size (standardised mean difference) based on a counterfactual comparison.

Standardised mean differences and confidence intervals for the most appropriate estimates of the impact of the intervention or approach for the Toolkit were extracted from each included study, along with other study variables. These effect sizes were further synthesised into a single pooled effect using a random effects meta-analysis adopting a restricted maximum likelihood (REML) estimation methods. For the full details of the methodology see the [Protocol and Analysis Plan \(https://educationendowmentfoundation.org.uk/public/files/Toolkit/EEF_Evidence_Database_Protocol_and_Analysis_Plan_June2019.pdf\)](https://educationendowmentfoundation.org.uk/public/files/Toolkit/EEF_Evidence_Database_Protocol_and_Analysis_Plan_June2019.pdf).

References (44)

The forest plot below is a graphical representation of the results of all included studies in this Toolkit strand. It shows the effect size and confidence interval of each study, and whether the particular intervention in that study was more or less effective than standard practice or other alternative interventions that the study looked at.

Studies that show an effect size result on the right-hand side of the red vertical red indicate that the particular intervention studied was more effective than standard practice. Studies that show an effect size on the left-hand side of the red vertical indicate that the particular intervention studied was less effective than standard practice.


Author	Title	Effect Size	Effect Size (Graph)
Schwankl (2013)	Flipped classroom : effects on achievement and student perception (NA)	Effect Size: 2.464 LCI: 1.678 UCI: 3.249 Weight: 1.681 Standard error: 0.401	
Yousefzadeh (2015)	The effect of flipped learning (revised learning) on Iranian students' learning outcomes. (Advances in Language and Literary Studies)	Effect Size: 1.826 LCI: 1.158 UCI: 2.494 Weight: 1.904 Standard error: 0.341	
Nordstrom (2012)	The impact of online and traditional homework on the attitudes, achievement, and learning styles of sixth grade language arts students (NA)	Effect Size: 1.544 LCI: 0.936 UCI: 2.151 Weight: 2.025 Standard error: 0.31	
Wiginton (2013) 1_2	Flipped Instruction: an Investigation Into the Effect of Learning Environment on Student Self-Efficacy, Learning Style, and Academic Achievement in an Algebra 1 Classroom (NA)	Effect Size: 1.533 LCI: 0.869 UCI: 2.198 Weight: 1.911 Standard error: 0.339	
Lai (2018)	The effectiveness of team-based flipped learning on a vocational high school economics classroom (Interactive Learning Environments)	Effect Size: 1.248 LCI: 0.754 UCI: 1.743 Weight: 2.26 Standard error: 0.252	
Foyle (1984) 1_1	The effects of preparation and practice homework on student achievement in tenth-grade American History (NA)	Effect Size: 1.06 LCI: 0.595 UCI: 1.525 Weight: 2.321 Standard error: 0.237	

Author	Title	Effect Size	Effect Size (Graph)
Al-Naqbi (2014)	The effects of instructional homework technique on chemistry achievement of the United Arab Emirates male and female tenth graders. <i>(International Journal for Research in Education)</i>	Effect Size: 0.81 LCI: 0.515 UCI: 1.105 Weight: 2.646 Standard error: 0.15	
Chao (2015)	Exploring students' learning attitude and achievement in flipped learning supported computer aided design curriculum: A study in high school engineering education <i>(Computer Applications in Engineering Education)</i>	Effect Size: 0.782 LCI: 0.355 UCI: 1.209 Weight: 2.397 Standard error: 0.218	
Wiginton (2013) 1_1	Flipped Instruction: an Investigation Into the Effect of Learning Environment on Student Self-Efficacy, Learning Style, and Academic Achievement in an Algebra 1 Classroom <i>(NA)</i>	Effect Size: 0.745 LCI: 0.101 UCI: 1.388 Weight: 1.953 Standard error: 0.328	
Spilka (2014)	Pedagogical Experiment With Online Visualization of Mathematical Models in Math Teaching on Elementary School. <i>(Iceri2014: Proceedings of the 7th International Conference of Education, Research and Innovation)</i>	Effect Size: 0.74 LCI: 0.187 UCI: 1.293 Weight: 2.139 Standard error: 0.282	
Robledo-Ramón (2013) HW	Strategy instruction for writing composition at school and at home <i>(Estudios de Psicología)</i>	Effect Size: 0.722 LCI: 0.154 UCI: 1.29 Weight: 2.107 Standard error: 0.29	
Foyle (1984) 1_2	The effects of preparation and practice homework on student achievement in tenth-grade American History <i>(NA)</i>	Effect Size: 0.698 LCI: 0.265 UCI: 1.131 Weight: 2.385 Standard error: 0.221	
Schultz (2014)	Effects of the Flipped Classroom Model on Student Performance for Advanced Placement High School Chemistry Students <i>(Journal of Chemical Education)</i>	Effect Size: 0.679 LCI: 0.162 UCI: 1.197 Weight: 2.211 Standard error: 0.264	
Tsai (2015)	The Effects of Problem-Based Learning with Flipped Classroom on Elementary Students' Computing Skills: A Case Study of the Production of Ebooks <i>(International Journal of Information and Communication Technology Education)</i>	Effect Size: 0.589 LCI: 0.184 UCI: 0.994 Weight: 2.441 Standard error: 0.207	
Bartelet (2016)	The Differential Effect of Basic Mathematics Skills Homework via a Web-Based Intelligent Tutoring System across Achievement Subgroups and Mathematics Domains: A Randomized Field Experiment <i>(Journal of Educational Psychology)</i>	Effect Size: 0.416 LCI: 0.183 UCI: 0.648 Weight: 2.743 Standard error: 0.118	

Author	Title	Effect Size	Effect Size (Graph)
Van Voorhis (2011)	Adding Families to the Homework Equation: A Longitudinal Study of Mathematics Achievement <i>(Education and Urban Society)</i>	Effect Size: 0.396 LCI: 0.044 UCI: 0.747 Weight: 2.544 Standard error: 0.179	
Kirvan (2015)	Flipping an Algebra Classroom: Analyzing, Modeling, and Solving Systems of Linear Equations <i>(Computers in the Schools)</i>	Effect Size: 0.374 LCI: -0.166 UCI: 0.914 Weight: 2.165 Standard error: 0.276	
Ramaglia (2015)	The flipped mathematics classroom : a mixed methods study examining achievement, active learning, and perception <i>(NA)</i>	Effect Size: 0.344 LCI: 0.16 UCI: 0.527 Weight: 2.807 Standard error: 0.093	
Davis (2004)	The impact of parental involvement : a study of the relationship between homework and kindergarten Texas Primary Reading Inventory scores <i>(NA)</i>	Effect Size: 0.32 LCI: 0.096 UCI: 0.544 Weight: 2.755 Standard error: 0.114	
Saunders (2014)	The flipped classroom: Its effect on student academic achievement and critical thinking skills in high school mathematics. <i>(NA)</i>	Effect Size: 0.308 LCI: -0.21 UCI: 0.827 Weight: 2.21 Standard error: 0.264	
Montgomery (2015)	The effects of flipped learning on middle school students' achievement with com mon core mathematics. <i>(NA)</i>	Effect Size: 0.308 LCI: -0.056 UCI: 0.673 Weight: 2.52 Standard error: 0.186	
Bailey (2006)	Interactive Homework: A Tool for Fostering Parent-Child Interactions and Improving Learning Outcomes for At-Risk Young Children <i>(Early Childhood Education Journal)</i>	Effect Size: 0.286 LCI: -0.256 UCI: 0.827 Weight: 2.162 Standard error: 0.276	
Hungi (2017)	Investigating the Effects of Community-Based Interventions on Mathematics Achievement of Girls from Low-Income Households in Kenya <i>(Cogent Education)</i>	Effect Size: 0.28 LCI: 0.105 UCI: 0.455 Weight: 2.817 Standard error: 0.089	
McGrath (1992)	Student and parental homework practices and the effect of English homework on student test scores <i>(NA)</i>	Effect Size: 0.186 LCI: -0.351 UCI: 0.723 Weight: 2.171 Standard error: 0.274	

Author	Title	Effect Size	Effect Size (Graph)
Clark (2013)	Examining the effects of the flipped model of instruction on student engagement and performance in the secondary mathematics classroom: An action research study (NA)	Effect Size: 0.17 LCI: -0.264 UCI: 0.604 Weight: 2.384 Standard error: 0.221	
Esperanza (2016)	Flipped Classroom Model: Effects on Performance, Attitudes and Perceptions in High School Algebra (Technology-enhanced learning (European conference))	Effect Size: 0.158 LCI: -0.254 UCI: 0.569 Weight: 2.428 Standard error: 0.21	
Kirmızı (2019)	The impact of the flipped classroom on receptive and productive vocabulary learning (Journal of Language and Linguistic Studies)	Effect Size: 0.144 LCI: -0.371 UCI: 0.66 Weight: 2.216 Standard error: 0.263	
Lonigan (1998)	Relative Efficacy of Parent and Teacher Involvement in a Shared-Reading Intervention for Preschool Children from Low-Income Backgrounds. (Early Childhood Research Quarterly)	Effect Size: 0.122 LCI: -0.497 UCI: 0.741 Weight: 2.003 Standard error: 0.316	
Metcalf (2015)	The impact of flipping a middle school classroom on student achievement. (NA)	Effect Size: 0.112 LCI: -0.328 UCI: 0.552 Weight: 2.372 Standard error: 0.224	
Smith (2015)	The efficacy of a flipped learning classroom (NA)	Effect Size: 0.105 LCI: -0.309 UCI: 0.518 Weight: 2.424 Standard error: 0.211	
Flansburg (2016)	Flipped Learning Instruction : Differentiating Mathematics Instruction Through the Use of Technology (NA)	Effect Size: 0.093 LCI: 0.005 UCI: 0.181 Weight: 2.893 Standard error: 0.045	
Özcan (2015)	Enhancing Mathematics Achievement of Elementary School Students through Homework Assignments Enriched with Metacognitive Questions (EURASIA Journal of Mathematics, Science & Technology Education)	Effect Size: 0.085 LCI: -0.52 UCI: 0.69 Weight: 2.031 Standard error: 0.309	
Glynn (2013)	The effects of a flipped classroom on achievement and student attitudes in secondary chemistry. (NA)	Effect Size: 0.055 LCI: -0.354 UCI: 0.463 Weight: 2.434 Standard error: 0.209	

Author	Title	Effect Size	Effect Size (Graph)
Dadas (1976)	A study of the effects of assigning spiral exploratory homework upon achievement in and attitude towards mathematics (NA)	Effect Size: 0.053 LCI: -0.329 UCI: 0.434 Weight: 2.487 Standard error: 0.195	
Bell (2015)	An investigation of the impact of a flipped classroom instructional approach on high school students' content knowledge and attitudes toward the learning environment (NA)	Effect Size: 0.051 LCI: 0.049 UCI: 0.053 Weight: 2.92 Standard error: 0.001	
Flick (2019)	The effects of flipped learning in the sixth-grade mathematics classroom (NA)	Effect Size: 0.05 LCI: -0.223 UCI: 0.324 Weight: 2.68 Standard error: 0.14	
Ripley (2015)	An examination of flipped instructional method on sixth graders' mathematics learning: Utilizing propensity score matching. (NA)	Effect Size: 0.029 LCI: -0.345 UCI: 0.403 Weight: 2.502 Standard error: 0.191	
Meloy (1987)	Effects of homework on language arts achievement in third and fourth-grades (NA)	Effect Size: 0.02 LCI: -0.287 UCI: 0.326 Weight: 2.626 Standard error: 0.156	
Kiesner (1997)	The effects of a parental homework monitoring intervention on school engagement of high risk middle school students (NA)	Effect Size: 0 LCI: -0.818 UCI: 0.818 Weight: 1.622 Standard error: 0.417	
Duffy (2016)	The impact of flipped learning on student achievement in an eight grade earth science classroom (NA)	Effect Size: -0.09 LCI: -0.506 UCI: 0.325 Weight: 2.42 Standard error: 0.212	
Tamayo (1992)	Hispanic parent monitoring of seventh grade mathematics homework assignments and relationship with achievement and self-esteem (NA)	Effect Size: -0.166 LCI: -0.872 UCI: 0.54 Weight: 1.83 Standard error: 0.36	
Freet (2016)	Flipping the classroom : an exploration of the effect of inverted learning on student achievement in a high school mathematics classroom (NA)	Effect Size: -0.343 LCI: -1.134 UCI: 0.449 Weight: 1.67 Standard error: 0.404	

Author	Title	Effect Size	Effect Size (Graph)
Tupesis (1972)	Mathematics learning as a consequence of the learner's involvement in interactive problem-solving tasks (NA)	Effect Size: -0.719 LCI: -1.337 UCI: -0.1 Weight: 2.003 Standard error: 0.316	
Howell (2013)	Effects of an inverted instructional delivery model on achievement of ninth-grade physical science honors students (NA)	Effect Size: -1.975 LCI: -3.493 UCI: -0.458 Weight: 0.778 Standard error: 0.774	