



Five Years of Tutoring Research: What We Have Learned Since the Pandemic

Carly D. Robinson, David Gormley, Susanna Loeb
Stanford University



Five Years of Tutoring Research: What We Have Learned Since the Pandemic

Over the past decade, a growing body of research has identified high-impact tutoring as one of the most effective strategies for improving student learning. Early studies established that personalized, relationship-based instruction delivered frequently and in small groups can produce substantial academic gains. In recent years, attention has increasingly turned to a more difficult question: how tutoring programs operate at scale, equitably and cost-effectively, within the constraints of real school systems.

The COVID-19 pandemic accelerated interest in tutoring as schools sought strategies to address learning disruptions and support academic recovery. This brief synthesizes research published since 2021 on three questions: what features make tutoring effective, how tutoring programs operate in real educational systems, and what conditions influence implementation and student participation.

Across the past five years, several conclusions have emerged. Tutoring programs produce the largest learning gains when they maintain frequent sessions, small student-tutor ratios, and sustained tutor-student relationships. At the same time, implementing tutoring at scale introduces logistical challenges related to staffing, scheduling, and participation. Understanding how tutoring programs balance effectiveness with scalability has therefore become a central focus of recent research.

Acknowledgement: We are grateful to the districts, providers, researchers, and policymakers who contributed to this body of work. We especially thank the Smith Richardson Foundation for its continued support of our research program.

Understanding tutoring impact: Core design features and implications for scale

Core instructional features

A growing body of experimental and quasi-experimental research identifies several program features that consistently predict tutoring effectiveness. Tutoring programs tend to produce larger learning gains when sessions occur frequently (typically three or more times per week), when tutors work with one or a small number of students, and when tutor-student relationships are sustained over time.¹ These features form the core of what the field commonly refers to as high-impact tutoring.² Recent research also suggests that the effects of tutoring can persist over time, with some studies documenting learning gains lasting several years after tutoring concludes.³

Design tradeoffs as tutoring programs scale

Although the evidence on effective tutoring design is increasingly clear, implementing tutoring with the frequency and student-tutor ratios associated with the largest learning gains can be difficult to sustain at scale. Many tutoring programs therefore face tradeoffs between maintaining the instructional features associated with effectiveness and operating within practical constraints related to staffing, scheduling, and cost.

Recent research has examined how variations in tutoring dosage affect student outcomes. Across studies, higher tutoring dosage is consistently associated with larger academic gains.^{4, 5, 6} At the same time, some work explores alternative tutoring structures designed to increase scalability. For example, studies find that younger students can benefit from shorter but more frequent tutoring sessions when tutoring is paired with structured independent practice on a linked learning platform.^{7, 8} These findings suggest that optimal tutoring dosage may vary across student populations, subjects, and instructional models.

A related line of research examines the effects of different student-tutor ratios. Experimental evidence indicates that one-on-one tutoring often produces the largest academic gains, although small-group tutoring (two to four students per tutor) can still generate positive learning outcomes.^{9, 10, 11} Recent work provides insight into the mechanisms underlying these differences. For example, analyses of tutoring interactions show that students working one-on-one with a tutor receive substantially more individualized instruction and relationship-building than students in small-group settings.¹² Studies also find that tutors working with multiple students often allocate more attention to lower-achieving students.¹³ These findings highlight tradeoffs between tutoring efficiency and instructional

personalization. Increasing the number of students per tutor may reduce costs but can alter how tutors distribute attention and interact with students, particularly in virtual environments.

Researchers have also examined whether aligning tutoring with classroom instruction improves student outcomes. Although the curricular alignment hypothesis has long been discussed in the tutoring literature, empirical evidence has only recently emerged. Recent studies find that students tend to experience larger gains when tutoring content is aligned with classroom curricula or instructional standards.^{10,14}

Overall, these findings suggest that the effectiveness of tutoring depends on maintaining a set of core instructional features, including frequent interaction, individualized attention, and sustained tutor-student relationships. As tutoring programs expand, a central question for research is how innovations designed to increase scalability affect these features and, in turn, student learning outcomes. One set of innovations receiving increasing attention involves the use of technology to support or extend tutoring models.

Technology-supported tutoring models

As tutoring programs expand, researchers have increasingly examined the role technology can play in supporting or scaling tutoring models. In this context, technology may enable tutoring in several ways: by facilitating remote tutoring sessions, by relieving administrative burdens, by supporting tutors with instructional tools, or by delivering automated instruction directly to students.

To date, human-delivered tutoring has the strongest evidence base.¹⁵ Most research evaluates in-person tutoring programs, although studies conducted since the COVID-19 pandemic demonstrate that remote tutoring delivered by human tutors can also improve student outcomes, including among younger learners.^{6,8,15-19}

Beyond delivering tutoring remotely, researchers have also explored whether technology itself can play an instructional role. Computer-assisted learning (CAL) platforms can produce modest gains when used independently,^{20,21} but take-up is often too low to produce meaningful learning gains, even for platforms designed with learning sciences in mind. These tools may be particularly effective when complemented by human instruction.^{7,20,22}

Human tutoring with AI support, in which AI tools assist human tutors rather than replacing them, is emerging as a promising approach to improving tutor practice. One study finds that an embedded AI-based tutoring tool providing tutors with real-time support for addressing student mistakes improves student learning, particularly for students working with less effective and novice tutors.²³

More recently, researchers have begun to investigate AI tutoring delivered directly to students. Rigorous evidence on fully autonomous generative AI tutors remains limited, though prior research on intelligent tutoring systems (ITS), an earlier version of AI-based instructional tools, provides a more established evidence base with reviews finding moderate positive effects on student achievement.²⁴ Students appear to use AI tutors more effectively when a human is alongside to provide emotional and pedagogical support.²⁵ Early studies of AI tutoring with human support suggest that AI tutors can impact student learning, though the effect sizes are modest and student engagement with the platform likely remains a limiting factor.²⁶ Recent experimental research found that pairing students with a human tutor while they used an AI platform substantially increased platform usage and engagement. However, overall usage remained far below recommended levels, and the intervention did not produce measurable gains in academic achievement.²⁷ These preliminary findings suggest that hybrid models, such as combining human tutoring with technological support or AI tutoring with human support, may offer pathways for expanding tutoring while maintaining core instructional features. What is clear from existing research is that human support increases students' engagement and the productive use of technology and AI tutors.^{25,27}

Students vary in how they respond to technology-mediated instruction²⁰, and further research should explore which students are likely to succeed with AI tutors and under what conditions students benefit from human support. For example, one study found that students who set well-defined learning goals engage with AI platforms for 25 percent longer and master 40 percent more skills, suggesting that student readiness and self-regulation may be critical in determining who can succeed with more autonomous, technology-based models versus those requiring stronger human support.²⁸

Additional outcomes of tutoring

In addition to academic achievement, recent research has begun examining whether tutoring influences broader student outcomes such as attendance, engagement, academic interests, and career trajectories. For example, research provides evidence that tutoring may reduce special education placements.²⁹

New research on a statewide tutoring initiative found that students were less likely to be absent on days when tutoring was scheduled.³⁰ The effect was strongest in programs most aligned with high-impact tutoring standards: tutoring conducted during the school day, with low student-tutor ratios, and higher dosage. These results suggest tutoring can boost student engagement, as reflected in improved attendance, while promoting equitable access to supportive learning environments. The finding that lower ratios produced larger attendance gains aligns with other research showing that smaller group sizes facilitate stronger tutor-student relationships,¹¹ which is consistent with the possibility that tutor-student relationships influence student engagement and attendance.

These relationships may also shape students' academic interests and identities. Female students tutored by female tutors showed large increases in STEM interest and earned higher math grades compared to female students tutored by male tutors.³¹ These effects emerged primarily in in-person tutoring rather than remote settings, which is a pattern consistent with research showing that while in-person and remote tutoring produce similar academic gains, tutors form stronger relationships with students when tutoring face-to-face.¹⁷ Students tutored remotely were more likely to miss sessions, and tutors reported forming weaker connections with students compared to in-person interactions. These findings suggest that tutor-student relationships may depend partly on setting, and that those relationships can be actively cultivated. An experimental study found that a brief activity highlighting shared interests between tutors and students at the start of a program meaningfully increased session attendance, with stronger effects for in-person than remote tutoring.³²

Beyond engagement and identity, tutoring may also generate longer-term benefits. A randomized trial of an online tutoring program for low-performing secondary students found that, among students without prior tutoring experience, the program improved math grades and increased vocational training enrollment more than a year after the program ended.³³ Collectively, these findings suggest that tutoring programs may influence outcomes beyond academic achievement, including student engagement, attendance, academic interests, and longer-term educational and career pathways.

The research reviewed above identifies several features associated with tutoring effectiveness, including frequent interaction, individualized attention, and sustained tutor-student relationships. Many of these features, however, are difficult to maintain when tutoring programs expand beyond small pilot interventions and operate within the logistical constraints of real school systems. As a result, recent research has increasingly shifted from asking whether tutoring works to examining how tutoring programs are implemented, how tutors are recruited and deployed, and how program design influences which students receive tutoring. Delivering tutoring with these features consistently therefore requires systems capable of recruiting tutors, coordinating schedules, and sustaining student participation. The next section examines how tutoring programs operate in practice as they expand within school systems.

Understanding the tutoring landscape: Workforce, recruitment, and scale

Research on tutoring has increasingly moved beyond estimating program impacts to examining how tutoring operates in real educational systems. As districts and states expand tutoring programs, new questions emerge: who serves as tutors, how tutors are recruited and retained, how tutoring is delivered, and whether programs can maintain the features associated with effectiveness as they scale.

Recent research examines these issues by studying tutor supply, recruitment strategies, delivery formats, and implementation conditions.

Tutor supply and tutor effectiveness

Research shows that tutoring can be delivered by a wide range of educators. Teachers, paraprofessionals, college students, paid volunteers, and unpaid volunteers can all serve as tutors. National service programs and university partnerships, including educator preparation programs and emerging tutoring apprenticeship programs, have also become key pipelines for recruiting tutors. However, studies also find differences in effectiveness across tutor types, with unpaid volunteers often showing weaker results.³⁴ Less experienced tutors typically require more training, curricular support, and instructional feedback to deliver effective instruction. At the same time, recent research suggests that program features—such as meeting dosage thresholds and supporting tutors in adapting instruction—may be more important than tutor type alone in determining program effectiveness.⁴

One strategy for expanding tutor supply is cascading peer tutoring, in which older students tutor younger students.³⁵ For example, high school students may tutor elementary students, or college students may tutor middle school students. Recent evidence suggests that cross-age peer tutoring programs produce small to moderate positive academic effects for both tutors and tutees across a range of settings, student types, and subject areas, though further research is needed to identify specific factors that may enhance effectiveness.³⁶

Remote tutoring substantially expands the potential tutor pool by allowing schools to recruit tutors beyond their local communities. Comparative studies generally find that remote and in-person tutoring produce similar academic gains, although in-person tutoring may offer advantages for attendance and relationship-building.^{17, 5} Remote tutoring can introduce challenges related to distractions, limited accountability, and technology issues that may undermine student motivation and engagement.³⁷ However, research suggests that program design choices can mitigate many of these challenges³⁸.

Overall, these findings suggest that the available tutor workforce is broader than often assumed, although program design and support structures play a critical role in determining tutor effectiveness.

Tutor recruitment strategies

Recent research suggests that recruitment strategies can substantially influence the size of the tutor workforce. In one study examining outreach to college students, emphasizing the financial benefits of tutoring in recruitment emails nearly tripled the number of program applications.³⁹ In contrast, messages highlighting social impact, career development, or prosocial motivations did not significantly

increase application rates. These findings suggest that potential tutors may respond more strongly to concrete information about compensation than to messages emphasizing the social value of tutoring.

These findings highlight how recruitment strategies influence tutor supply. However, expanding the tutor workforce is only one component of scaling tutoring programs.

Challenges of scaling tutoring programs

A recurring finding in the tutoring literature is that programs often produce larger effects in early studies than in later large-scale implementations. A recent meta-analysis helps explain this pattern.⁴⁰ As tutoring programs expand, cost and capacity constraints frequently lead programs to operate with lower tutoring dosage and higher student-tutor ratios, accounting for roughly one-third of the difference in observed impacts. Implementation fidelity may also decline as programs grow, particularly when districts face staffing shortages or scheduling constraints. In addition, early evaluations often focus on students with the greatest academic need, as these students may have more room to improve and frequently experience larger gains from tutoring. Programs that maintain multiple evidence-based design features may be more likely to sustain effectiveness as they expand to broader student populations and contexts.

These findings suggest that expanding tutoring programs involves balancing scale with fidelity to the instructional features associated with effectiveness. As tutoring programs expand, maintaining dosage, small student-tutor ratios, and consistent tutor-student interactions becomes an increasingly important challenge.

Confidence in high-impact tutoring

Survey data suggest broad and sustained confidence in high-impact tutoring from both educators and caregivers. According to the Institute of Education Sciences' School Pulse Panel, 42 percent of public schools reported offering high-dosage tutoring during the 2024-25 school year, and of those, 91 percent rated it as moderately, very, or extremely effective in improving student outcomes.⁴¹ A separate nationally representative principal survey similarly indicates strong support: when asked how they would prioritize additional funding for student supports, roughly a third of principals identified high-intensity tutoring as their top choice. Approximately 80 percent of principals offering high-intensity tutoring reported maintaining or expanding the number of students served during 2024-25, suggesting schools have largely sustained tutoring programs even as federal recovery funding has declined.⁴² This support extends beyond educators: in a recent national survey of 23,000 parents, 86% of respondents said they were in favor of free tutoring for K-12 students who fall below grade level.⁴³

Together, this research highlights the practical constraints that shape how tutoring programs operate in real educational systems and set the stage for understanding the conditions that enable successful implementation. The next section examines the organizational and institutional conditions that shape whether tutoring programs can be implemented consistently and whether students participate.

Understanding enabling conditions: Implementation and participation

Moving from evidence on tutoring effectiveness to consistent implementation in schools requires integrating tutoring into existing school systems and structures, not building parallel ones. Recent research identifies both the logistical barriers districts face and the institutional conditions that support successful implementation.

Leadership and infrastructure

Schools consistently identify two structural constraints as barriers to tutoring implementation: securing physical space for tutoring and scheduling tutoring sessions within the school day. Districts must allocate rooms for tutoring and cover the associated facilities costs, including utilities and maintenance.^{44,45} Scheduling tutoring without disrupting core instruction often proves even more difficult.³⁵ Schools that designate dedicated tutoring blocks in master schedules and receive administrative support for scheduling logistics appear more successful in sustaining tutoring programs.⁴⁶ This may become easier for administrators as recent developments in AI-driven scheduling tools have emerged as powerful solutions to the complex challenges of master scheduling.⁴⁷

Research increasingly characterizes tutoring implementation as a substantial responsibility at both the school and district levels.^{35,44,46} Districts that treat tutoring as a peripheral initiative often struggle to deliver tutoring with the dosage and consistency associated with effectiveness. Embedding tutoring within a multi-tiered system of supports (MTSS) framework can help address this by positioning tutoring as Tier 2 or Tier 3 intervention rather than an add-on, integrating it into existing structures for scheduling, progress monitoring, and resource allocation. Principal engagement appears particularly important. Principals who understand tutoring design and actively support scheduling, staffing, and coordination are more likely to sustain higher quality tutoring programs.⁴⁸ Many schools also rely on a designated “tutoring champion,” often a lead teacher or instructional leader who manages logistics, communicates with staff, and ensures tutoring aligns with instructional priorities.⁴⁴

Emerging evidence also points to outcomes-based contracting as one strategy to strengthen implementation.⁴⁹ In outcomes-based contracting models, districts and providers establish shared

expectations for delivery and results, aligning incentives and increasing engagement across both parties.

Student participation

Even when tutoring programs are successfully implemented, student participation varies substantially across program models. Recent research examines how family engagement and program design influence whether students access tutoring and attend sessions consistently.

Family engagement influences whether students access tutoring and how consistently they participate. Research shows that families influence both initial uptake and ongoing participation in school-based tutoring programs.

When schools offer free, on-demand tutoring that requires students to opt in, communication strategies can increase the likelihood that students access the resource.⁵⁰ However, the vast majority of students in these programs still do not choose to opt in and thus do not receive tutoring.

Families may also contribute directly to the effectiveness of tutoring programs. New descriptive evidence suggests that a one standard deviation increase in family engagement with a tutoring program was associated with roughly 10 additional hours of tutoring.⁵¹ Regular communication with caregivers about student progress may strengthen engagement.⁵² Research shows that caregivers value not only academic support but also social-emotional development, wanting their child to become a confident and motivated learner, enjoy the tutoring experience, and build a strong connection with their tutor.⁵²

Program design choices can substantially influence whether students participate in tutoring and attend sessions consistently. Following the pandemic, many districts introduced on-demand tutoring programs that allowed students to access tutoring as needed. These programs typically relied on opt-in participation. Evidence indicates that the majority of students never accessed the tutoring services.⁵⁰ Students with the greatest academic need were often the least likely to participate.

Districts also consider out-of-school-time tutoring programs because they reduce scheduling pressure during the school day. However, these programs often face participation challenges. Attendance frequently depends on transportation availability and family schedules. Participation may remain low when tutoring relies on voluntary attendance.^{45,46}

These findings highlight how organizational infrastructure, family engagement, and program design shape whether students receive tutoring in practice.

Looking ahead: Implications for research and practice

Over the past five years, research has substantially expanded the evidence base on tutoring. Early studies focused primarily on whether tutoring improves student achievement. More recent work has examined how tutoring programs operate in real educational systems and how program design and implementation influence effectiveness at scale.

Several findings are now well supported. The research suggests that tutoring effectiveness depends on both instructional design and the institutional conditions that support implementation. Tutoring programs tend to produce larger gains when they maintain core design features such as frequent sessions, small student-tutor ratios, sustained tutor-student relationships, and alignment with classroom instruction. Research also suggests that technology can support tutoring through virtual delivery and instructional tools, although human interaction remains a central component of effective tutoring models.

At the same time, recent studies highlight the practical challenges of implementing tutoring programs within school systems. This research suggests that tutoring effectiveness depends not only on instructional design but also on how tutoring programs are embedded within school systems. Scheduling, staffing, infrastructure, and program coordination all influence whether tutoring can be delivered consistently. Student participation also varies across program models, with family engagement and program design shaping whether students access tutoring and attend sessions regularly.

Future research will likely focus on identifying tutoring models that preserve the instructional features associated with effectiveness while remaining feasible for schools and districts to implement at scale. As tutoring programs continue to expand, understanding how implementation conditions, program design, and student participation interact will remain an important area of inquiry.



References

1. Nickow, A., Oreopoulos, P., & Quan, V. (2024). The promise of tutoring for PreK–12 learning: A systematic review and meta-analysis of the experimental evidence. *American Educational Research Journal*, 61(1), 74–107. <https://doi.org/10.3102/00028312231208687>
2. Robinson, C. D., & Loeb, S. (2021). *High-impact tutoring: State of the research and priorities for future learning*. EdWorkingPapers.com. <https://doi.org/10.26300/QF76-RJ21>
3. Finseraas, H., Nyhus, O. H., Salvanes, K. V., & Jorde Sandsør, A. M. (2024). *Sustained effects of small-group instruction in mathematics*. CESifo Working Paper. <https://doi.org/10.2139/ssrn.4783701>
4. Huffaker, E., Lee, M. G., Zhou, H., Robinson, C. D., & Loeb, S. (2025). *Beyond the one-teacher model: Experimental evidence on using embedded paraprofessionals as personalized instructors*. EdWorkingPapers.com. <https://doi.org/10.26300/PZY2-WR51>
5. Bhatt, M. P., Chau, T., Condliffe, B., Davis, R., Grossman, J., Guryan, J., Ludwig, J., Magnaricotte, M., Mattera, S., Momeni, F., Oreopolous, P., Stoddard, G. (2025). *Personalized learning initiative interim report: Findings from 2023–24*. MDRC. <https://eric.ed.gov/?id=ED678145>
6. Ready, D. D., McCormick, S. G., & Shmoys, R. J. (2024). *The effects of in-school virtual tutoring on student reading development: Evidence from a short-cycle randomized controlled trial*. EdWorkingPapers.com. <https://doi.org/10.26300/569P-WZ78>
7. Cortes, K. E., Kortecamp, K., Loeb, S., & Robinson, C. D. (2025). A scalable approach to high-impact tutoring for young readers. *Learning and Instruction*, 95, 102021. <https://doi.org/10.1016/j.learninstruc.2024.102021>
8. Kortecamp, K., & Peters, M. L. (2024). The impact of a high-dosage tutoring program on reading achievement of beginning readers: A multi-level analysis. *Journal of Education for Students Placed at Risk (JESPAR)*, 29, 291–309. <https://doi.org/10.1080/10824669.2023.2179056>
9. Robinson, C. D., Pollard, C., Novicoff, S., White, S., & Loeb, S. (2025). The effects of virtual tutoring on young readers: Results from a randomized controlled trial. *Educational Evaluation and Policy Analysis*, 47(4), 1245–1265. <https://doi.org/10.3102/01623737241288845>
10. Jackson, C., & Shakeel, A. (2025). *Creating coherence: Does instructional alignment affect the impact of tutoring?* EdWorkingPapers.com. <https://doi.org/10.26300/EN9J-XP53>
11. Kraft, M. A., & Lovison, V. S. (2025). The effect of student–tutor ratios: Experimental evidence from a pilot online math tutoring program. *Educational Evaluation and Policy Analysis*. <https://doi.org/10.3102/01623737251364573>
12. Hsieh, H., Gormley, D., Robinson, C. D., & Loeb, S. (2026). The power of personalized attention: Comparing pedagogical approaches in small group and one-on-one early literacy tutoring. *Education Sciences*, 16(1), 142. <https://doi.org/10.3390/educsci16010142>

13. Zhang, Q., Wang, R. E., Ribeiro, A. T., Demszky, D., & Loeb, S. (2025). *Educator attention: How computational tools can systematically identify the distribution of a key resource for students*. EdWorkingPapers.com. <https://doi.org/10.26300/HVQ6-D385>
14. Huffaker, E., Robinson, C. D., Bardelli, E., White, S., & Loeb, S. (2025). *When interventions don't move the needle: Insights from null results in education research*. EdWorkingPapers.com. <https://doi.org/10.26300/58DD-6D02>
15. Barnes, M. A., Clemens, N. H., Simmons, D., Hall, C., Fogarty, M., Martinez-Lincoln, A., Vaughn, S., Simmons, L., Fall, A.-M., Roberts, G. (2024). A randomized controlled trial of tutor- and computer-delivered inferential comprehension interventions for middle school students with reading difficulties. *Scientific Studies of Reading*, 28(4), 411–440. <https://doi.org/10.1080/10888438.2024.2331517>
16. Neitzel, A. J., & Storey, N. (2024). *Air reading: A randomized evaluation of a virtual tutoring model*. Johns Hopkins University. <https://jscholarship.library.jhu.edu/handle/1774.2/70119>
17. Hashim, S., Pace Miles, K., & Croke, E. (2025). *Experimental evidence on the impact of tutoring format and tutors: Findings from an early literacy tutoring program*. EdWorkingPapers.com. <https://doi.org/10.26300/ZGY5-SR80>
18. Carlana, M., & La Ferrara, E. (2025). Apart but connected: Online tutoring, cognitive outcomes, and soft skills. *American Economic Review*, 115(10), 3487–3513. <https://doi.org/10.1257/aer.20240401>
19. Gortazar, L., Hupkau, C., & Roldán-Monés, A. (2024). Online tutoring works: Experimental evidence from a program with vulnerable children. *Journal of Public Economics*, 232, 105082. <https://doi.org/10.1016/j.jpubeco.2024.105082>
20. Eames, T., Brunskill, E., Yamkovenko, B., Weatherholtz, K., & Oreopoulos, P. (2026). Computer-assisted learning in the real world: How Khan Academy influences student math learning. *Proceedings of the National Academy of Sciences*, 123, e2507708123. <https://doi.org/10.1073/pnas.2507708123>
21. Di Pietro, G., & Munoz, J. C. (2025). A meta-analysis on the effect of technology on the achievement of less advantaged students. *Computers & Education*, 226, 105197. <https://doi.org/10.1016/j.compedu.2024.105197>
22. Bhatt, M., Guryan, J., Khan, S., LaForest-Tucker, M., & Mishra, B. (2024). *Can technology facilitate scale? Evidence from a randomized evaluation of high dosage tutoring* (NBER Working Paper No. 32510). National Bureau of Economic Research. <https://doi.org/10.3386/w32510>
23. Wang, R. E., Ribeiro, A. T., Robinson, C. D., Loeb, S., & Demszky, D. (2025). *Tutor CoPilot: A human-AI approach for scaling real-time expertise*. EdWorkingPapers.com. <https://doi.org/10.26300/81NH-8262>



24. Létourneau, A., Martineau, M. D., Charland, P., Karran, J. A., Boasen, J., Léger, P. M. (2025). A systematic review of AI-driven intelligent tutoring systems (ITS) in K-12 education. *npj Science of Learning*, 10, 29. <https://doi.org/10.1038/s41539-025-00320-7>
25. Thomas, D. R., Lin, J., Gatz, E., Gurung, A., Gupta, S., Norberg, K., Fancsali, S. E., Aleven, V., Branstetter, L., Brunskill, E., & Koedinger, K. R. (2024). Improving student learning with hybrid human-AI tutoring: A three-study quasi-experimental investigation. In *Proceedings of the 14th Learning Analytics and Knowledge Conference (LAK '24)*, pp. 404–415). Association for Computing Machinery. <https://doi.org/10.1145/3636555.3636896>
26. LearnLM, Wang, A., Rysbek, A., Huber, A., Nambiar, A., Kenolty, A., Caulfield, B., Lilley-Draper, B., Groot, B., Veprek, B., Burdett, C., Willis, C., Barton, C., Smith, D., Mu, G., Walters, H., Jurenka, I., Hulls, I., Stalley-Moores, J., ... Brazão, V. (2025). *AI tutoring can safely and effectively support students: An exploratory RCT in UK classrooms*. arXiv. <https://doi.org/10.48550/arXiv.2512.23633>
27. Robinson, C. D., Gormley, D., Ribeiro, A. T., & Loeb, S. (2026). *The role of human support in student engagement with AI tutoring platforms*. EdWorkingPapers.com. <https://doi.org/10.26300/pz7p-p388>
28. Borchers, C., Houk, A., Aleven, V., & Koedinger, K. R. (2025). Engagement and learning benefits of goal setting with rewards in human-AI tutoring. In *Proceedings, Part IV Artificial Intelligence in Education (AIED) 26th International Conference* (pp. 46–59). Springer-Verlag. https://doi.org/10.1007/978-3-031-98459-4_4
29. Hingstman, M., Neitzel, A. J., & Slavin, R. E. (2023). Preventing special education assignment for students with learning or behavioral difficulties: A review of programs. *Journal of Education for Students Placed at Risk*, 28, 380–411. <https://doi.org/10.1080/10824669.2022.2098131>
30. Lee, M. G., Loeb, S., & Robinson, C. D. (2026). The impact of high-impact tutoring on student attendance: Evidence from a state initiative. *AERA Open*. <https://doi.org/10.1177/23328584261448132>
31. Bleiberg, J., Robinson, C. D., Bennett, E., & Loeb, S. (2026). The impact of tutor gender match on girls' STEM interest, engagement, and performance. *American Educational Research Journal*. Advance online publication. <https://doi.org/10.3102/00028312261417332>
32. Robinson, C. D., Chadeesingh, L., Tagliaferri, G., Barnard Gonzalez, C., Rogers, T., & Gehlbach, H. (2026). *Early relational investments improve tutoring attendance at scale* (EdWorkingPaper No. ai26-1441). EdWorkingPapers.com. <https://doi.org/10.26300/2hgt-3t67>
33. Anger, S., Christoph, B., Galkiewicz, A., Margaryan, S., Sandner, M., & Siedler, T. (2025). *Online tutoring, school performance, and school-to-work transitions: Evidence from a randomized controlled trial*. EdWorkingPapers.com. <https://doi.org/10.26300/1MY6-WM69>

-
34. Neitzel, A. J., Lake, C., Pellegrini, M., & Slavin, R. E. (2022). A synthesis of quantitative research on programs for struggling readers in elementary schools. *Reading Research Quarterly*, 57(1), 149–179. <https://doi.org/10.1002/rrq.379>
 35. Kraft, M. A., & Falken, G. T. (2021). A blueprint for scaling tutoring and mentoring across public schools. *AERA Open*, 7. <https://doi.org/10.1177/23328584211042858>
 36. Chang, A., Mauer, E., Wanzek, J., Kim, S., Scammacca, N., Swanson, E. (2025). Examining the academic effects of cross-age tutoring: A meta-analysis. *Educational Psychology Review*, 37, 19. <https://doi.org/10.1007/s10648-025-09997-z>
 37. Yung, K. W. H., & Wong, S. F. P. (2024). L2 motivation in shadow education: Analysing students' L2 learning experience in online English private tutoring. *The Language Learning Journal*, 52, 556–570. <https://doi.org/10.1080/09571736.2024.2305409>
 38. Beberman, X., Novicoff, S., Ribeiro, A. T., Robinson, C. D., & Loeb, S. (2025). *Understanding disruptions: Causes of and variation in lost instructional time*. EdWorkingPapers.com. <https://doi.org/10.26300/K6DA-T861>
 39. Robinson, C. D., Meyer, K., Bailey-Fakhoury, C., Zandieh, A., & Loeb, S. (2026). Answering the call: How changes to the salience of job characteristics affects college students' decisions. *Social Science Research*. <https://doi.org/10.26300/3gr7-1476>
 40. Kraft, M. A., Schueler, B. E., & Falken, G. (2024). *What impacts should we expect from tutoring at scale? Exploring meta-analytic generalizability*. EdWorkingPapers.com. <https://doi.org/10.26300/ZYGJ-M525>
 41. National Center for Education Statistics. (2025). *School pulse panel: Tutoring*. U.S. Department of Education, Institute of Education Sciences. <https://nces.ed.gov/surveys/spp/results.asp#tutoring-may24-chart-5>
 42. Balfanz, R., & Byrnes, V. (2025). *Are K-12 students getting the evidence-based supports they need? Progress and challenges four years after the pandemic*. Everyone Graduates Center, Johns Hopkins University School of Education. https://www.partnershipstudentsuccess.org/wp-content/uploads/2025/11/2025-RAND-Report_FINAL.pdf
 43. 50CAN. (2026). *The state of educational opportunity in America: A 50-state survey of 23,000 parents*. <https://50can.org/education-opportunity-survey/>
 44. Makori, A., Burch, P., & Loeb, S. (2024). *Scaling high-impact tutoring: School level perspectives on implementation challenges and strategies*. EdWorkingPapers.com. <https://doi.org/10.26300/H8Z5-T461>
 45. White, S. M., Groom-Thomas, L. J., Lu, A., & Loeb, S. (2026). Challenges and strategies to scale high-impact tutoring: Learning from school districts' implementation efforts. *Education Finance and Policy*, 1–22. <https://doi.org/10.1162/EDFP.a.434>



46. Carbonari, M. V., Davison, M., DeArmond, M., Dewey, D., Dizon-Ross, E., Goldhaber, D., Hashim, A. K., Kane, T. J., McEachin, A., Morton, E., Muroga, A., Patterson, T., & Staiger, D. O. (2024). The impact and implementation of academic interventions during COVID-19: Evidence from the Road to Recovery Project. *AERA Open*, 10. <https://doi.org/10.1177/23328584241281286>
47. Lu, A., Rouhanifard, P., Cleveland, C., Gilbert, E., & Loeb, S. (2025, March). *The key resource of time: Master schedules and effective allocation of students and educators*. Stanford Accelerator for Learning, SCALE Initiative.
<https://nssa.stanford.edu/sites/default/files/Master%20Scheduling.pdf>
48. White, S. M., Groom-Thomas, L., & Loeb, S. (2023). *A systematic review of research on tutoring implementation: Considerations when undertaking complex instructional supports for students*. EdWorkingPapers.com. <https://eric.ed.gov/?id=ED672158>
49. Lu, A., Groom-Thomas, L., & Loeb, S. (2025). *Exploring the potentials of outcomes-based contracting: Findings from initial implementations*. EdWorkingPapers.com.
<https://doi.org/10.26300/8R8R-7F03>
50. Robinson, C. D., Bisht, B., & Loeb, S. (2025). The inequity of opt-in educational resources and an intervention to increase equitable access. *Educational Researcher*, 54(6), 328–338.
<https://doi.org/10.3102/0013189X251331518>
51. Hall, G. J., Parker, D. C., Nelson, P. M., & Putzeys, S. N. (2024). Family involvement in elementary reading intervention: Compensatory relations to dosage and tutor-level heterogeneity. *Remedial and Special Education*, 45, 279–291. <https://doi.org/10.1177/07419325231217313>
52. Deeney, T. A., Dozier, C. L., Laster, B., Gallagher, T. L., Waller, R., Rhodes, J. A., Milby, T. M., Gurvitz, D., Cavendish, L., Huggins, S. S., Msengi, S., McAndrews, S. L., Gray, E. S., McCarty, R., Ferrara, P. (2024). Family perspectives of university reading clinic/literacy lab experiences: What matters. *Journal of Teacher Education*, 75, 424–437.
<https://doi.org/10.1177/00224871231211266>