ObjectiveEd.com
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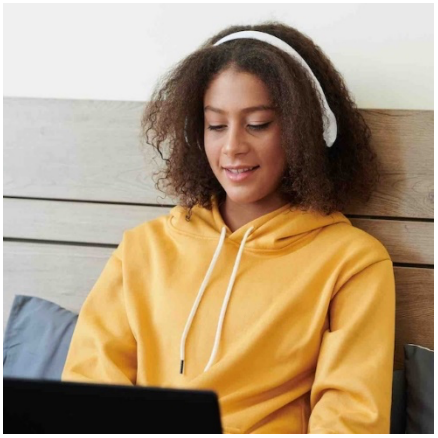
BuddyBooks

Engaging, Interactive, Measurable Help
For
Struggling Readers

"How Does It Work?" and Other Frequently Asked Questions



National Science Foundation

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Overview

In the past several years, thousands of children and adults have used the AI-assisted reading tool we developed called BuddyBooks. This document provides an overview of how BuddyBooks works. It also has a list of questions people have asked about how it works, what's the science behind it, and how it can be used in home or school or afterschool settings.

We are not educators; we are scientists and engineers who have had a lot of help from some seriously good educators and researchers. BuddyBooks tackles reading challenges with research-driven methods that boost oral reading fluency, accuracy, reading duration, and stamina. It builds on the success of Braille AI Tutor, an earlier innovation we developed under a Microsoft AI for Accessibility Grant. Designed to help blind students, Braille AI Tutor combined Natural Language Processing and gamification. Students read sentences aloud from a refreshable braille display (akin to a one-line braille Kindle) and earned points in a treasure-hunting game as their reading skills improved.

Taking that experience as a guide, we extended BuddyBooks' core framework based on more research and engineering experimentation and insights from the science of reading. Technically, it is very solid, but the secret sauce is:

1. It is very simple… easy for kids and teachers and parents to use… easy to understand.
2. It has a zero footprint
   a. No technology to install and maintain
   b. No privacy or security issues
   c. No changes to curriculum, or lesson plans, or classroom management approaches
   d. Training is minimal… 5 to 10 minutes for teachers or parent; 30 seconds for kids.
3. Loads of books of all kinds for free
4. We designed BuddyBooks so kids see it as a computer game… it's nonjudgmental... gives positive feedback… provides what we term micro-successes... kids see they are achieving and getting better at reading… and they read!

ObjectiveEd's Mission

Our technology is focused on improving literacy outcomes for students everywhere and especially in underserved communities by providing a **transformative reading experience** to students with a disability, and support for any student struggling to read at their grade level.

The Problem

As we mentioned above, we began this journey with a focus on helping blind children learn how to read Braille. We then shifted to dyslexic kids and helped them strengthen their reading skills. Along the way people have asked for help for children with ADHD and kids with autism spectrum disorder. BuddyBooks has proven helpful for many of those kids. It also happens that children in school and home school settings also need help.

For several years biennial testing through National Assessment of Educational Progress (NAEP) has consistently shown that two-thirds of U.S. children are unable to read with proficiency. An astounding 40% are essentially nonreaders. The latest NAEP results just published (Jan 2025) show an even more gloomy depiction of the current situation than in past years. Students of color are disproportionately impacted. 52% of Black fourth grade children and 45% of Hispanic fourth graders score below basic reading levels, compared to 23% of white students, according to National Center for Education Statistics assessments. This problem is not getting materially better and represents a real crisis for educators across the country who are trying to deal with it.

How Does BuddyBooks Help?

BuddyBooks is a computer tool that uses Artificial Intelligence to work with struggling readers. Our team at ObjectiveEd developed it using their experience with AI and other technologies and help from

numerous researchers in education and, specifically, reading. Our work has received support from the National Science Foundation, Microsoft, and others. When combined with Benetech's **Bookshare** library or other content, it helps struggling readers with challenges to improve their reading skills. **BuddyBooks** works by attacking the core issue that children do not get enough reading practice each day to become proficient. More information on how it works is provided in a later section, but at its simplest, it works using a three-pillar framework to deliver results:

- Reading that's engaging:
  - Uses a multi-sensory, multiple modality approach incorporating both listening and reading out loud.
  - Breaks the book into smaller readable passages to reduce reading fatigue and cognitive load and improve fluency and comprehension.
- Reading that's interactive:
  - Utilizes AI Neural Voicing, and advanced book parsing to break books up into readable chunks and co-read the book with the child.
  - Tracks and points out errors to the child and coaches them to self-correct.
  - Reads out loud to improve comfort and confidence amongst struggling readers by removing peer pressure, and they can hear themselves improve.
- Reading that's measurable:
  - Uses Automatic Speech Recognition (ASR), specifically pronunciation assessment from Microsoft, captures and displays reading duration, fluency (correct words/minute), phonetic accuracy, and self-corrections for teachers or parents to review.
  - We can also use analytics to measure vocabulary exposure and growth, and provide teachers with data about how the whole class is progressing.

BuddyBooks doesn't teach reading or pick books. Teachers and reading coaches and tutors do that heavy lifting. **BuddyBooks** creates a focused, structured reading environment that dynamically interacts with the child and enhances the effectiveness of each practice session.

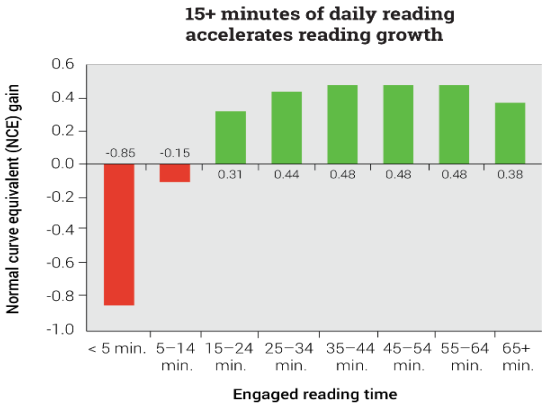
And as research has proven, **BuddyBooks** works by motivating the child. The motivation/success process is misunderstood. It turns out that motivation does not spark achievement, at least initially, achievement creates the motivation to achieve more.[9] Struggling readers start using **BuddyBooks,** and it lowers the barriers to them being able to read (more on this later). Then they begin to see themselves as successful, better readers in the future. Not surprisingly, we have not found any child who doesn't want to be able to read. Initial success breeds more success.

Why Is Daily Reading So Important?

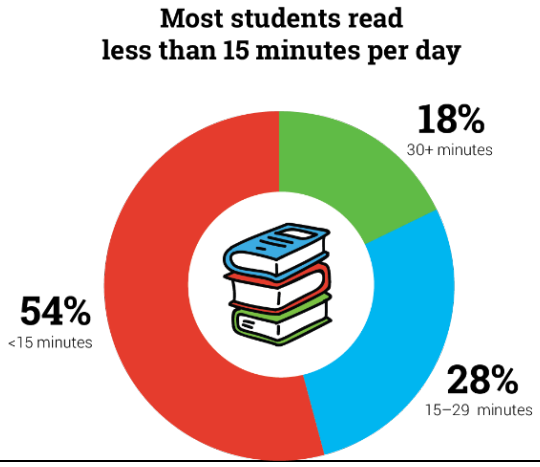
Teaching kids how to read is certainly complex. And each child will have differentiated abilities and needs to proceed at their own pace. Research has shown that across broad cross sections of students of all abilities, reading practice could be the single most important factor in a child developing into a proficient reader. But changes in the ecosystem around reading have altered behaviors. There is no, one, single cause, but smart phones, the internet, video games, audio books, and changes in family settings have all contributed. Kids have so many distractions in and outside of schools that reading practice doesn't happen as much as it once did 50 years ago. As described in a recent analysis of possible causal factors, the author argues that the downward trends are worse for the lower performing students than the averages indicate and that things outside schools' control may be at work. [7]

Using **BuddyBooks** changes that. It and the child read in close collaboration, and the child has to do real work—read words they mispronounce; read words they don't know the meaning of; and try their best. They hear their mistakes, and they hear themselves fixing the mistakes. It becomes a positive feedback loop. They can sense they are improving. They see odd or new words in multiple contexts and begin to understand them.[8] The hard work is paying off.

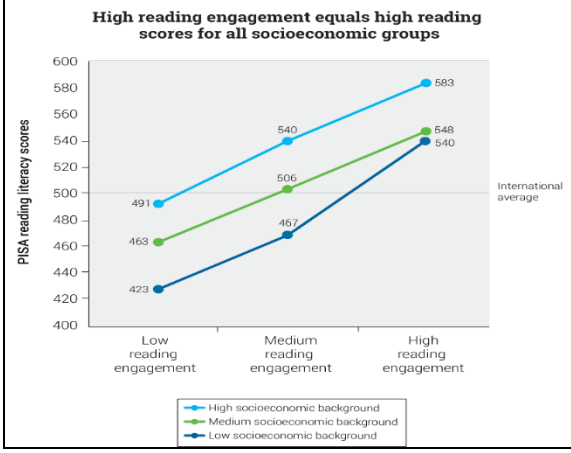
Students who read at least 15 minutes per day achieve significant gains in reading outcomes:



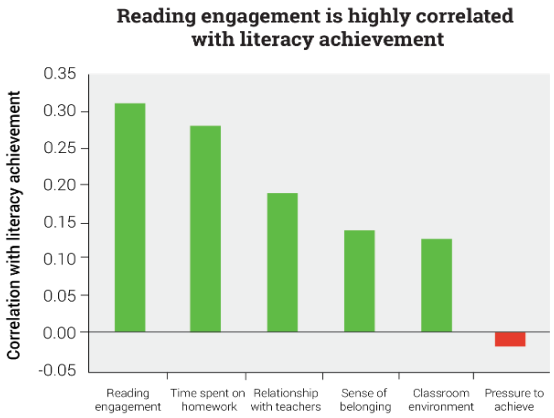
But most students read less than 15 minutes per day:



Students with the **lowest socioeconomic background, but high reading engagement** scored better on literacy achievement than students with the highest socioeconomic background but low reading engagement.



Reading engagement is **more correlated with literacy achievement than almost any other factor**, such as time spent on homework, pressure to achieve, relationship with teachers, or classroom environment.



We've known for some time how the cognitive processes in the brain rewire themselves to accommodate reading. [11] In many respects the brain is an organic machine that is incredibly good at processing images and sounds and other sensory data. But the rewiring process is not simple or quick. The brain shifts around image pattern processing capability to handle text and connect it to sounds and mental definitions (pictures) the child already understands. e.g., saying the word "cow" or "car" and linking them to the images and sounds already known from past experience, hearing those words spoken by others and

seeing those objects either in pictures or in real life. Practice, handing the visual cortex this new rewiring job repeatedly, speeds and reinforces the rewiring. Failure to practice slows the whole process down dramatically. And, as with many brain processes, younger children get the job done more quickly than, for example, an older adult trying to learn how to read. Our conclusion: young kids' failure to read and practice their reading skills is one of the biggest drivers of the reading crisis.

How BuddyBooks Works

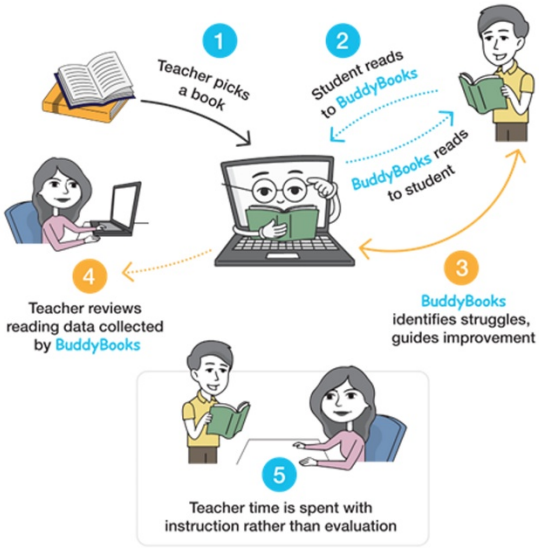
BuddyBooks [5] is a computer tool that uses Artificial Intelligence (AI) to work with students learning to read. It was developed by our team at ObjectiveEd using their experience with technology and AI and help from numerous researchers in education and, specifically, reading. Our work has received support from the National Science Foundation, Microsoft, and others.

Thanks to a partnership with Bookshare, funded through the U.S. Department of Education, Office of Special Education Programs, **BuddyBooks** provides over 1 million books. Our collection includes K-12 textbooks, classroom reading books, and fiction and nonfiction books. The teacher selects a handful of books for each student based on their reading level, the student picks one of those books and begins reading.

Students find the books provided with BuddyBooks to be highly engaging with books ranging from "Hank the Cow Dog" to "Harry Potter". That's why they tend to read longer and longer each day.

Using this engaging content, **BuddyBooks** helps struggling readers improve their reading skills. Students use **BuddyBooks** in or outside of school, reinforcing skills they've learned and supplementing those skills that need improvement. Further, **BuddyBooks** helps teachers by offloading work and providing comprehensive information about how each student is performing, and the challenges they face.

Consider the illustration on the right. Using books from the Bookshare library (1) or other available digital content, **BuddyBooks** enables a student and the computer (2) to alternate reading a story to each other, one sentence or paragraph at a time. That keeps the student **engaged in the story as they co-read with the computer. Because they are reading alternately, it lowers cognitive load. That means the student can be reading more at their interest level, instead of their reading-skill level**, which the student might consider too immature. The idea is, of course, to allow students to engage at their own pace and begin to see reading as interesting and fun. For those of you who are more technically inclined, this is a small part of an idea called Collaborative Strategic Reading.[10]



As the student reads, the AI engine in **BuddyBooks** is continuously listening and analyzing the student's oral reading. The AI uses this analysis to help the student when 1they struggle. (3) It keeps track of where mistakes occurred, or

performance issues were detected and brings the student back later to try again. The child can hear how they read the paragraph and how it should be properly read. Then the AI asks them to try again. And they do. (We get into more detail about this below.) The AI captures this information and shows the instructor, in a web dashboard (4), where the student may need extra help. (5) The teacher or parent can also listen to specific passages where the child struggled and hear what they read incorrectly. This helps with diagnosing issues and planning corrective actions.

Reading to the computer and having the AI coach make suggestions and point out things to improve is very effective. And, importantly, as the child is reading with the computer, their performance anxiety is lower than reading with a teacher or parent, or out loud in a classroom. In surveys of children who are using **BuddyBooks**, none have seen t he coaching provided by the AI as anything other than helpful. It isn't their teacher or their parent critiquing them; to them it's a computer "game." They quickly figure out that the way to beat the game is to get better at reading.

The Outcomes

BuddyBooks has been evaluated by LXD Research and has earned ESSA Tier IV certification "Demonstrating Rationale" based on its "*proven effectiveness in enhancing grade level learning outcomes*", and ESSA Tier III certification "Promising" from a "*BuddyBooks Acceptability and Appropriateness Study*". As part of a National Science Foundation funded project, we are currently conducting a multi-month RCT study to achieve Tier I/II certification.

Real students using **BuddyBooks** have achieved real results and improved their fluency, comprehension, and confidence. Teachers and parents with the assistance of BuddyBooks have gained leverage over the issues and have new insights into a child's progress and problems. The content used is chosen by the teacher or parent. The student is assigned one book at a time to read from as large a library of selections as the teacher or parent may assign.

BuddyBooks empowers students to improve on their own using several research-proven methods. Each day, when a student starts their BuddyBooks session, the computer checks their last reading session and finds a specific passage that the student struggled with.

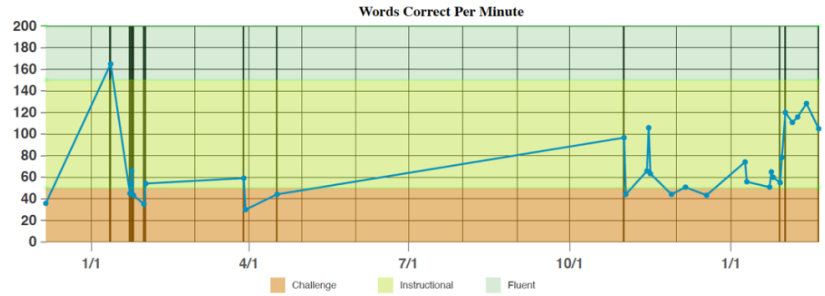
In the first few minutes of the session, that passage is "model-read" to the student, drawing their attention to the specific parts they struggled with. Then the student listens to the audio from when they first read that passage, allowing the student to listen to their reading, and hear their mistakes. That's called self-monitoring.

Finally, the student reads the passage again, self-correcting where they struggled. It's this real-time combination of model-reading, self-monitoring, and self-correction that achieves these reading skill improvements. Plus, those self-corrections are the critical micro-successes that drive motivation.

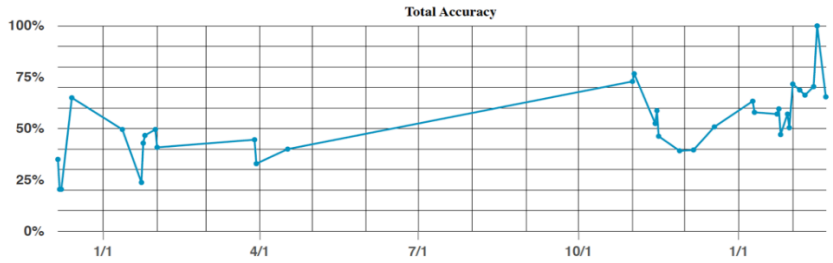
Results from hundreds of children in our early trials, show fluency improvements averaging 24% and reading time lengthening to about 15 minutes or more per day. As **BuddyBooks** provides this "right-now," continuous assessment of a student's oral reading, it gathers data, such as fluency measured in correct words per minute, to document each student's improvement in reading skills.

BuddyBooks eliminates the need for stop watches to measure words/minute in a "cold read". It not only provides the data needed to assess a student's reading but provides data so a teacher can individualize each student's education, targeting those students that need help the most. There is no time lag or waiting for a test to uncover a problem. For example, the following charts produced by the system show Total Accuracy and Fluency (correct words per minute) over a 12-month period for an actual student with dyslexia using BuddyBooks: The vertical black lines on the fluency graph are when books changed.

Words Correct Per Minute



Total Accuracy



What Some of Our Users Have Told Us

"Before using BuddyBooks, I tended to add words. Now it corrects me when I add words, and that helps me get better." -- Hannah, 11-year-old

"BuddyBooks gives my children the feedback they need to improve." -- Rebecca, mom of a 12-year-old girl and a 15-year-old boy.

"Students tell me that they view reading with BuddyBooks as "leisure activity" and they can't wait to turn on their PC and continue reading every day. Students like to hear themselves read (part of BuddyBook's Review Mode), and this feature helps them improve their oral reading skills." – Stephanie Hui, Pittsburgh Public Schools.

"I like BuddyBook's co-reading feature; it's like what I suggest parents to do with their children. I'm glad BuddyBooks records a student's fluency (correct words/minute), instead of just recording reading speed. Many teachers are only concerned with how fast a student reads; not how accurately they read. BuddyBooks provides the data so teachers can view a student's accuracy and can provide instruction where its most needed." -- Mandy Horton Walker, Professional S.P.I.R.E. Teacher Trainer/School Specialist.

"Buddy Books was incorporated at the beginning of the summer, and I've seen a tremendous change with the 4th and 5th graders with them wanting to read in an online program. Once we had an opportunity to go with BuddyBooks, you definitely see the kids are trying to use it and reading and actually are being engaged in the lesson." -- Travis Conway, Executive Director, Edna Runner Tutorial Center

Frequently Asked Questions

- Does BuddyBooks always work and help every child?
  While BuddyBooks works for the vast majority of struggling readers, we have encountered situations where for some reason, the student just doesn't make progress or may have a disability that affects their ability to successfully interact with the computer. If this happens with your child or student, please inform us.

- What else do I need besides BuddyBooks and a computer or tablet?
  To make the program work, just an internet connection. But basic reading skills are also needed. If a child has never tried to read, or had much experience being read to, they'll need instruction in word recognition and decoding. For example, a dyslexic student may be able to use BuddyBooks for practice, but they also need to be supported by an instructor working with them on an appropriate curriculum.

  If the child is trying to read in a noisy environment, or in a classroom with other readers, it may also be helpful to use a headset with a noise cancelling microphone to help the computer listen more easily and the student can read out loud, but more quietly. There are many models available, but one popular choice is the Logitech H111, available on Amazon for about $13 (as of Winter '25).

- I have several students; can I use a single BuddyBooks account for all of them?
  No, each student should have their own account so that the computer can keep its interactions

focused on that one student. A teacher or parent has a master account that manages each or a group of students or children.

- I'm concerned about the privacy of my child's information. Her reading progress and issues are my family's business, no one else's. Should I be concerned using BuddyBooks?
  Firstly, you are right to be concerned. Secondly, you should rest assured that BuddyBooks will not be an issue. We do not collect or need any personally identifiable information about your child. We use the Login ID to identify them in our system; no real names or birthdays, or school ID's are needed. We also use comprehensive and rigorous security tools and processes and encrypt all our data. Please refer to Appendix A for a detailed description of our commitment to student privacy.

- How do I ensure that the books my child is reading are appropriate for them?
  We have a large library of books for readers of all skill levels available in BuddyBooks, but we do not select any book for any particular reader. That assignment is made by their instructor or parent. Kids who are reading can access only those books that have been made available to them by their instructors or parents.

- Must my child finish a given book in order to start another?
  No, if you the parent or a teacher has assigned multiple books, all of them are available at the same time. Your child could click on the "pause" symbol on the screen and then click "Back". BuddyBooks will then display the available library of books, and they can select and start reading another book.

- How do I know if my child is making progress in their reading?
  The instructor dashboard provides all the data you need to assess progress. As reading speed and accuracy improve, you can assign books with more complexity. BuddyBooks itself does not grade kids, but it provides the key data to let you make those judgements.

- I've heard that AI's are dangerous and can act in unpredictable or uncontrollable ways. Should I be worried about BuddyBooks?
  While certain troublesome situations have been reported, the AI engines in BuddyBooks are very different from other AI tools. They are focused solely on three things: (1) listening to spoken words and tracking reading performance; (2) identifying a good example of a recent reading issue to have the child go back and work on; and (3) providing statistical and factual data to teachers and parents about the reading taking place. Our AI's have been constructed with strict boundaries; they have nothing else to do and have no capability to do anything else. You need not be worried.

Citations and References

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[4] Gilmour, A. F., Fuchs, D., & Wehby, J. H. (2019). Are students with disabilities accessing the curriculum? A meta-analysis of the reading achievement gap between students with and without disabilities. Exceptional Children, 85(3), 329-346.

[5] ObjectiveEd is a for-profit corporation whose mission is to improve educational outcomes for students with disabilities using education technology. The company leverages federal and state grants and partners with leading researchers to build innovative products for students. www.objectiveed.com

[6] Benetech is a global nonprofit focused on education equity, eliminating barriers to knowledge, and providing opportunity for all learners and is partially funded from the U.S. Department of Education, Office of Special Education Programs (OSEP). Benetech's social mission focuses on systemic barriers to education equity through comprehensive engagement within individual communities. www.benetech.org

[7] Malkus, Nat (2025) Testing Theories of Why, Four Keys to Interpreting US Student Achievement Trends, American Enterprise Institute for Public Policy Research

[8] Kullberg, K., Ingerman, A., Marton, F., Planning and Analyzing Teaching, Using the Variation Theory of Learning (2024).

[9] Garon-Carrier, Gabrielle, Boivin, Michel, Guay, Frederic, et al., Intrinsic Motivation and Achievement in Mathematics in Elementary School: A Longitudinal Investigation of Their Association, Society for Research Into Child Development (2015) **https://doi.org/10.1111/cdev.12458**

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[11] Dehaene, Stanislas, *Reading in the Brain, the New Science of How We Read*, Penguin Books, 2009

APPENDIX

ObjectiveEd's Student Privacy Commitment

ObjectiveEd is committed to the effective use and security of private student information. With ObjectiveEd, schools, stakeholders, and parents alike can be assured that your students' information is in safe hands. We are compliant with all U.S. federal and state laws, as well as with the regulations of many other countries. Our Data Security and Incident Response Plan is available upon request.

Student Data is Secure
We minimize the amount of Teacher (or Parent) and Student Data we collect to only that data required to achieve the educational objectives of our service. We maintain an updated list of all the data we collect and its purpose; it is available upon request. All of the data ObjectiveEd houses is monitored around the clock in secure data centers in the United States, ensuring your data is protected from physical intrusions and natural disasters. Your data is encrypted in transit and at rest.

You Own Your School's Data
We will never sell, rent, transfer, disclose or distribute personal or student data without prior written consent, even if you choose to terminate your organization's contract with ObjectiveEd. We do not share any student data with any third party without a written request from you. We do not market to students, and we do not knowingly allow any third party to use our service to market to students. All student PII data is removed from our system when you request the deletion of such data, or when you terminate your subscription. All student PII data is removed from all backups at the next backup cycle. We commit to allowing schools to access and update student personal information, as part of your school's obligation to parents and students for the review and correction of their student data.

We Communicate with You, not Your Students
We do not directly communicate with, or provide direct online support to, your students, without a written request from you.

We Notify You of Changes
We will notify your designated contact of any change to the ObjectiveEd subscription agreement, which includes all details of our student data privacy commitment.

We Train Our Staff
Even the strongest systems are vulnerable if staff are not trained well. ObjectiveEd staff understand the importance of protecting your students' data and are trained and equipped with the appropriate resources to do so.
Some of the things we do to ensure our staff is well-trained include:

- Periodic training on how to protect client data, including procedures to follow in the event of a data breach.
- Our staff is trained to never move student data from our secure data centers on to portable or personal devices
- Our Research team is trained in research ethics (PHRP certified) and all research studies are approved by Institutional Review Boards, such as the American Foundation for the Blind's IRB.
- All staff who are likely to come into contact with student data are screened against federal criminal and sex offender registries.

COPPA Compliance
Our products are compliant with Children's Online Privacy Protection Rule, 15 U.S.C. 6501-6508, 16 CFR Part 312. COPPA imposes certain requirements on operators of websites or online services directed to children under 13 years of age, and on operators of other websites or online services that have actual knowledge that they are collecting personal information online from a child under 13 years of age.

FERPA Compliance
Our products are compliant with Family Education Rights and Privacy Act, 20 U.S.C. § 1232g; 34 CFR Part 99. FERPA gives parents certain rights with respect to their children's education records. These rights transfer to the student when he or she reaches the age of 18 or attends a school beyond the high school level.

AI Services
ObjectiveEd uses AI services for speech to text processing from commercial providers, and the Data and Privacy policies of these providers state that they do not retain any input or output data after the completion of the processing. As an added precaution ObjectiveEd sends no student data with the voice recordings when using these services. These Data and Privacy policies are available upon request.