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APA Expert Report on Children's and Adolescents' Learning With Educational Technology

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Why This Report, Why Now

Educational technology (“EdTech”) tools are frequently promoted for their potential to help children and adolescents (ages 5–18) learn, practice skills, and receive support, both at school and at home. Yet a central question remains: can we trust these EdTech tools to fulfill that promise? This report is written for those deciding whether and how to use educational technology tools in K-12 environments: educators choosing EdTech tools, families weighing the adoption of apps, school leaders reviewing purchases, developers designing EdTech tools, and policymakers setting rules.

Research to date shows that EdTech tools are not inherently beneficial or harmful to learners. The effects depend on what an EdTech tool asks the learner to do, how adults integrate it, and the age and needs of the child, and what it replaces. Those conditions are the subject of this report’s recommendations. EdTech tools are changing quickly, vary widely in quality, and are often marketed with claims that run ahead of the evidence. To ensure these EdTech tools effectively serve young people, decisions must be firmly grounded in rigorous scientific evidence rather than marketing promises.

By educational technology (“EdTech”), we mean digital tools, platforms, devices, apps, and systems used to support learning and teaching of educational content in the settings where young people learn, including classrooms, homes, tutoring programs, libraries, and after-school settings. Purely recreational technology use, personal smartphone policy, and social media use outside of learning contexts are addressed in other [APA health advisories](#) and are not covered here.

EVIDENCE ON EDUCATIONAL TECHNOLOGY, IN BRIEF

The scientific evidence to date supports six broad conclusions, which frame the recommendations below.

- Time spent, enjoyment, participation, and completion rates are often mistaken for learning.
- The real test of learning happens after the app is closed. Students may perform well within a tool but fail to retain or apply what they learned elsewhere.
- Features designed to capture attention can pull attention away from learning.
- The amount of time spent on screens is not as important as the activity it is replacing.
- Many claims about improving critical thinking, intelligence, and brain power are not supported by evidence.
- AI may improve performance while reducing learning. Students can produce better work while developing less independent knowledge and skill.

TYPES OF EDUCATIONAL TECHNOLOGY ADDRESSED IN THIS REPORT

- A. Built for learning.** EdTech tools designed for education: intelligent tutoring systems (digital tutors that adapt to how a student learns), AI-enabled learning technologies, adaptive software, structured digital curricula, educational games, early-learning apps, and instructional videos. *Example: a reading app for phonics practice.* This layer is the main subject of our evidence-based recommendations for children and adolescents.
- B. General-purpose EdTech tools used for learning.** Technology not built for learning but used in educational settings: AI chatbots, word processors, productivity suites, and search engines, as well as the video and social media platforms students may use, or be assigned to use, for schoolwork. *Example: Microsoft or Google Suite, etc.* Here we offer general guidance on context of use.
- C. Educational infrastructure.** The systems around the EdTech tools: 1:1 device programs, learning management systems, school networks, and internet filters/device management software. *Example: a school district's laptop program.* This is the implementation context that shapes what the first two categories actually do.

What we mean by “learning”

Learning occurs when children and adolescents retain, understand, and can later apply what they have learned. It is a relatively lasting change in knowledge, skills, or attitudes that results from experience, instruction, or study. While interest, motivation, attention, and participation can support learning, they are not the same as learning itself. Many educational technology tools emphasize outcomes that are easier to measure, such as time spent on a task, number of activities completed, or frequency of use. Although these metrics can provide valuable information about engagement and participation, they do not necessarily indicate whether learning has occurred. This report focuses on the outcomes that matter most: whether young people are actually acquiring knowledge and skills they can use in the future.



Recommendations

RECOMMENDATION 1: Identify the learning goals and outcomes when using an EdTech tool because success in an app does not guarantee broader learning.

Principle. *Not all EdTech tools should be judged in the same way. Tools designed to teach a specific skill should show that users learn that skill. For general-purpose tools, learning depends largely on how the tool is used, so the learning activity matters more than the tool itself. Claims that a tool improves intelligence, thinking ability, or learning in general deserves particular caution because evidence for broad gains from narrow practice is weak.*

Evidence

- **EdTech tools built for learning can show benefits.** Apps that give learners focused practice on specific early skills (e.g., letter sounds, sight words, counting, basic number facts) can show learning benefits, with the largest effects for young learners and for skills that can be measured precisely.^{22,23}
- **Evidence for “general skill” EdTech tools is weak.** Tools claiming to develop “critical thinking,” “problem solving,” or broad mental skills are not supported by research.^{24,25} The majority of commercially available tools in app stores have distracting features like ads or design that doesn’t encourage deep engagement, so carry lower education potential for younger learners.²⁶

Audience-specific implications

- **Educators:** First consider what kind of tool it is. If it is designed to teach a skill, ask whether students are learning that skill, look to high-quality third-party sources of testing and evaluation. If it is a general-purpose tool, ask how it is being used to support learning, whether the learning will generalize outside the app, and how those outcomes can be measured.
- **Families:** Be skeptical of EdTech tools that promise broad gains in intelligence, critical thinking, or “brain training,” and those that contain ads. Stronger claims name the specific skill being practiced, show how it connects to schoolwork, and provide evidence that young people can use the skill outside the tool.
- **Policymakers:** Separate procurement pathways for EdTech tools aimed at learning and general-purpose EdTech tools. Tools for learning should show independent evidence or 3rd party validation of their identified or targeted learning skill(s) purpose and ways of demonstrating learning retention. General-purpose EdTech tools should be approved only for specified instructional uses, with clear instructions or guidance for the training, monitoring of use quality, and review of whether learners gained the intended skill.

RECOMMENDATION 2: Judge EdTech tools by learning outcomes, not only engagement, enjoyment, or interest because these indicators are not the same as learning, and the ultimate test is what learners can do after they leave the tool.

Principle. *Before adopting an EdTech tool, consider what students will learn from it and how you will know. Evaluate the EdTech tool by whether the user can retain and apply what they learned, days later and away from the app, not by how long they use it, how much they enjoy it, or how interesting they find it.*

Evidence

- **Enjoying an EdTech tool is not the same as learning from it.** EdTech tools can receive high ratings for engagement or enjoyment but evidence shows little benefit for learning when knowledge and skills are measured directly.^{27,28} That is why learning outcomes, not engagement alone, are the most important test of an EdTech tool's value.
- **People are not always accurate judges of their own learning.** Activities that feel easy, enjoyable, or successful in the moment can produce weaker long-term retention than activities that require greater mental effort.^{29,30,31,32} As a result, children's and adolescents' confidence should not be treated as evidence that learning has occurred.
- **Strong evidence requires showing that learning extends beyond the digital environment itself.** Learners may perform well within an app because of built-in supports, prompts, or familiar question formats. A stronger test, however, is whether the student can explain, remember, and apply what they learned outside of the platform and after a period of time has passed. Immediate performance during practice provides weaker evidence than retention and application over time.^{33,34,35}

Audience-specific implications

- **Educators/Families:** Look for “show me” moments. Occasionally ask children and adolescents to explain what they are learning without the app open, or to apply a concept from the app to a real-world task. If they can explain the idea or demonstrate the ability to apply the knowledge while solving a problem, the tool may be fostering learning. If they can only succeed while inside the app, the tool may be teaching them to use the app but not producing learning. Focus on whether young people are synthesizing the content, rather than just engaging with the technology.
- **Policymakers:** Tie procurement to independent evidence or third-party validation. Do not accept “usage reports” or “engagement metrics” as proof of efficacy. Ask vendors to provide independent data or validation showing knowledge retention or skill transfer that persists at least one week after use.

- **Developers:** Be clear about what your EdTech tool is designed to teach. Explain what knowledge or skills learners are expected to gain and provide evidence that they learned it. Evidence should focus on learning, not simply on how often the EdTech tool is used, how many activities are completed, or how much users enjoy it.

Developmental Considerations

- **Younger learners, approximately ages 5–8:** EdTech tools are most useful when an adult helps children understand the purpose of the activity and connects it to talking, reading, writing, drawing, play, or hands-on experiences.
- **Pre-adolescent learners, approximately ages 9–12:** EdTech tools can support independent practice when they focus on a specific skill. Pre-adolescents benefit from opportunities to think about what they learned, what they found difficult, and whether they can use the skill outside of the tool.
- **Adolescent learners, approximately ages 13–18:** Adolescents can play a larger role in choosing and using EdTech tools. However, they still benefit from being asked to explain their thinking, check the accuracy of information, and demonstrate what they can do on their own. Learning remains strongest when adolescents actively do the thinking themselves rather than relying on an tool to do it for them.

RECOMMENDATION 3: Move beyond a focus on only screen time and evaluate what technology is replacing.

Principle. *The amount of time young people spend on screens for learning is one factor to consider, but by itself does not provide enough information to guide decisions about EdTech use at home or at school. To understand whether an EdTech experience is likely to prove beneficial, adults should consider what learners are using, why they are using it, who they are using it with, when and where it is being used, and what activities it may be replacing. Research suggests that these factors matter more than total screen time alone.*

Evidence

- **What young people do on screens matters as much as, or more than, how long they spend on them.** Learning and development are linked not only to the amount of screen time, but also to what children and adolescents watch or use, whether another screen is on in the background, whether adults use devices during everyday routines, and the reason technology is being used. These factors cannot be captured by measuring screen time alone.^{36,37}

- **Time spent on technology may mean less time for other activities.** What learners do less of as screen use increases is an important part of understanding its effects. More screen time is associated with less time for sleep, reading, physical activity, conversations with other young people, and hands-on activities.^{38,39,40,41,42}
- **The timing and sequencing of technology use matters.** The effects of technology use depend not only on the tool and the children and adolescents but also on when use occurs and what follows it. Highly stimulating or fast-paced digital activity is likely a poor fit before sleep, sustained reading, or other low-stimulation tasks that require calm, focused attention.^{43,44,45,46}

Audience-specific implications

- **Educators:** Consider the student's age and capabilities, the instructional content, what the technology is being used for, what activities it may be replacing, and opportunities for conversation about technology use. Review whether technology is replacing reading, discussion, hands-on learning, sleep, or social time with other learners (for example, during downtime, recess, or lunch), and adjust its use when those activities are more important for the learning goal.
- **Families:** Replace "How much screen time?" with "What are children and adolescents doing, when are they doing it, who is with them, and what is screen time crowding out or potentially replacing?"⁴⁷ Use firmer limits when content, timing, or context cannot be monitored, especially before sleep or when technology is replacing reading, play, movement, or social interaction. Have these conversations when the child is not engaged with screens and encourage them to share their thoughts and ideas rather than just telling them yours.
- **Policymakers:** For EdTech specifically, avoid setting expectations based on screen time alone. Technology guidance and purchasing decisions should consider what young people are doing on screens, when technology is used, what activities it may replace, and whether it supports or interferes with learning.

Developmental Considerations

- **Younger learners (ages 5–8):** At this stage, learning relies on hands-on, social experience. The risk is that screen time replaces the active, play-based exploration that helps children's brains develop.^{48,49} For this age group, adult guidance is key: a tool's purpose is really whatever the adult makes it. Choose tools that help children explore the world around them, rather than tools that keep them passively watching. Screen media should not be used to keep young children occupied or as a reward in school settings.



- **Pre-adolescent learners (ages 9–12):** This is a key time when children move from needing adults to manage their technology use, to managing it themselves. As they gain independence and the desire to self-direct, they begin to increasingly use technology for their own interests like schoolwork, curiosity, information gathering, or connection with others. The challenge shifts from controlling access to helping them start to self-regulate their technology use. Avoid technology use as a time filler (e.g., when assignments are completed during lunch) in educational settings.
- **Adolescent learners (ages 13–18):** During the teen years, technology use often conflicts with other needs, specifically the need for sleep and in-person social connection. A tool used for studying might be great, but engaging with it late at night or during downtime can still unfavorably impact a teen's health, no matter how good the content is. At this age, there should be higher expectations for self-regulated technology use, but educators and families should still support clear boundaries around important activities like sleep, time outdoors, and social time.

Note: A small set of explicit cautions on total exposure is retained where the evidence is strong: background television and media during early-childhood learning activities, and late-night use in adolescence. Beyond these, general guidance on household screen use is outside the scope of this report; families, who remain the ultimate decision-makers about technology use at home, can consult [APA's health advisories](#) and [pediatric guidance](#) for recommendations on general media use.

RECOMMENDATION 4: Choose tools built on research-based learning strategies because learning science matters more than technological innovation alone.

Principle. *Select EdTech tools that help young people use learning practices that psychological science has shown as effective, such as practicing remembering information without looking it up, returning to material over time, comparing similar ideas and problems, learning from examples, and understanding why an answer is correct or incorrect. These approaches have produced learning benefits across decades of research and are more likely to support learning than tools that mainly ask learners to watch, click, repeat, or collect rewards.*

Evidence

- **Children and adolescents learn more when they try to answer questions from memory rather than immediately looking up the answer.** Learning has been shown to be stronger when learners use retrieval practice (i.e., repeatedly test themselves by attempting to recall what they have studied) than when they only reread, review, or repeat the material.^{50,51,52,53}
- **Information is remembered better when people return to it over time.** More information is remembered when learning is spaced across several occasions rather than learned all at once.^{54,55,56,57,58,59}
- **Mixing related topics and problem types improves later performance.** Interleaving or mixing topics or types of problems while studying rather than focusing on just one type at a time can improve learning. This helps learners spot the differences between similar ideas and apply what they have learned to new situations. While this approach may feel more challenging than practicing one topic at a time, it can result in stronger, more lasting learning.^{60,61,62,63,64}
- **Intelligent tutoring systems have improved learning in many studies.** Positive outcomes have been shown to occur when tutoring programs (including some that rely on AI) provide opportunities to practice specific skills, respond to learner performance, and provide feedback during learning.^{65,66,67} In some cases, benefits can be stronger than those produced by textbooks, workbooks, and many forms of computer-based instruction.^{68,69,70,71,72}
- **Young people learn more from simulations when they are asked to make predictions and explain what happened.** Learning gains are larger when children and adolescents use simulations to test ideas and explain their thinking than when they simply explore the simulation. Activities that allow learners to explore on their own thinking tend to produce stronger results when they include guidance and explanation.^{73,74,75}

- **Understanding is often lower when longer and more complex text is read on a screen rather than on paper.**^{76,77} Smaller differences are observed when materials are designed specifically for reading on screens. A small advantage for handwriting over typing has also been observed in studies of note-taking.^{78,79,80}
- **Many popular formats produce limited evidence of broad learning benefits.** Educational games can improve performance on the activity being practiced but show less evidence of improving performance in very different academic tasks. Similar findings have been reported for many commercial brain-training products.^{81,82} Virtual reality shows promise for interest and participation, but consistent advantages for learning have not yet been established.^{83,84,85}

Audience-specific implications

- **Educators:** Check whether the tool helps students think through problems or simply gives them the answer. When students get stuck, does it offer hints and prompts that encourage them to recall information and try again? Favor tools that keep students doing the mental work rather than solving the problem for them.
- **Policymakers:** Build procurement rubrics around evidence of learning. Ask vendors to explain how the EdTech tool helps learners retain information, practice important skills over time, receive feedback that improves future performance, explain ideas, solve problems, and/or apply knowledge.
- **Developers:** Design apps for learning, not just participation. If a learning benefit cannot be linked with specific activities within the product, claims about educational value may not be substantiated.



RECOMMENDATION 5: Choose simple designs and prevent multitasking because technologies designed to capture attention can interfere with learning.

Principle. *People learn best when their attention stays on the learning task. Choose EdTech tools without competing images, sounds, alerts, pop ups, and notifications. Enable/disable and continue to intermittently monitor device security settings to prohibit these potential distractions and prevent multitasking. Busy, cluttered designs can undermine learning even when the content is good—especially for learners with attention, learning, or other difficulties.*

Evidence

- **Information that is not directly related to the lesson can diminish learning.** Stories, images, sounds, animations, and interactive features that are unrelated to the learning goal have been associated with lower recall and weaker understanding than materials that focus only on the information being taught.^{86,87,88,89}
- **Points, badges, streaks, and notifications can change what children and adolescents pay attention to.** When rewards become the focus, young people may pay more attention to earning points or maintaining progress markers than to understanding the content. Research also suggests that relying heavily on rewards can reduce learners' interest in an activity once the rewards are removed.^{90,91}
- **Switching tasks and multitasking has a cost.**⁹² Simultaneous use of multiple media, applications, screens, or online activities has been associated with poorer recall, lower reading comprehension, weaker note-taking, lower test performance, and poorer school performance.^{93,94,95,96,97}
- **Self-management is insufficient.** Children and adolescents often underestimate how much doing multiple things at once affects their learning. Lower learning is observed when attention is divided across multiple activities, even when young people believe they are learning just as effectively.⁹⁸
- **Social media platforms and personal smartphones are associated with increased distraction.** Research in educational settings associates the presence and use of these technologies with increased task-switching (jumping between unrelated activities) and greater multitasking, which has been shown to interfere with learning and retention.^{99,100,101}

Audience-specific implications

- **Educators:** As noted in Recommendation 2, prioritize learning outcomes over engagement metrics like “streaks” or time-on-task, and remain mindful about using tools that have digital distractions. Lock down

devices against these distractions and monitor security settings to prevent switching between tasks.

- **Families:** Be cautious of products that rely heavily on constant rewards, animations, sounds, pop-ups, games, or other features designed to keep your child engaged. Consider whether these features help them understand, remember, explain, or use what they are learning. If not, do not use that app.
- **Policymakers:** Consider distraction as carefully as content quality when funding digital products. Ask vendors to explain which features are designed to attract attention and ensure schools have the authority to remove or disable features that are not essential for learning.

RECOMMENDATION 6: Approach GenAI tools in the context of education with extra caution and age-appropriate guardrails because improved performance may come at the expense of independent learning.

Principle. *GenAI tools, whether designed for learning or general chatbots used for schoolwork, introduce challenges that are different from other EdTech. These new tools can generate answers, explanations, and ideas that young people would otherwise have to produce themselves. They can also use human-like language and interactions that make them feel more trustworthy, knowledgeable, or personally meaningful than other digital tools. Both issues require special attention, particularly for children and adolescents. The evidence base for learners in this area is still developing.*

Evidence

- **Young people may produce more complete answers while using AI without retaining skills and knowledge.** Early studies suggest that children and adolescents often complete tasks with more accuracy when using AI but may remember less of the material later or have more difficulty understanding or solving similar problems on their own.^{102,103}
- **AI use can make it harder to tell what a learner understands.** When AI helps produce an answer, essay, explanation, or solution, the finished work may reflect both the children's and adolescents' thinking and the tool's contribution. This makes task completion a less reliable sign of what they remember, understand, or can do without the tool.^{104,105}
- **Human-like characteristics in AI can increase trust and emotional closeness.** Children and adolescents may see a chatbot as more human-like, likable, trustworthy, and emotionally close when it uses warm, relationship-like, and/or agreeable language. Evidence on long-term effects is still limited, but studies of AI companions raise concerns about emotional reliance, especially for young people who are socially, emotionally, or psychologically vulnerable.^{106,107}

Audience-specific implications

- **Educators:** Create and communicate a policy for AI to students. Consider including assignments that assess student knowledge without AI's help. When using AI tools, you might ask students to show their first attempt before using AI, compare their answer with the AI response, identify differences, explain which answer is stronger and why, or revise their work based on feedback. Use AI most often after students have begun the work, not as a substitute for the first draft, first solution, or first idea.
- **Families:** Talk to children and teens about what types of AI use is OK for your family, and why. When used for schoolwork, be more cautious when AI regularly provides finished answers, completes assignments, settles disagreements, offers emotional support, or becomes the first place a child turns for help. Ask children what they tried before using AI, what the AI contributed, what they changed, and what they can now explain, solve, or do on their own.
- **Policy makers:** Use different standards for tools that provide feedback, guide practice, generate content, answer questions, tutor learners, or serve as companions. Procurement rubrics should ask what parts of the work remain the student's responsibility, what the AI does on the student's behalf, how the product supports independent thinking over time, and what safeguards are in place for younger users. Products that retain information from prior interactions, relationship-building features, emotional support, or highly personalized interactions should receive additional scrutiny because the research evidence in these areas remains limited.
- **Developers:** For each feature, identify whether the goal is to provide information, guide thinking, give feedback, generate ideas, or complete part of a task. Design AI so that students remain responsible for the parts of the activity that are meant to build understanding, reasoning, judgment, or skill. Avoid features that encourage trust, emotional attachment, repeated disclosure of personal information, or ongoing relationships with the system, and be transparent about how personalization and memory for interactions work.

Developmental Considerations

Developmental concerns regarding AI use vary and are reviewed by multiple recent reports.^{108,109} Here we outline a few developmental considerations relevant to the use of AI EdTech tools.

- **Younger learners, approximately ages 5–8:** At these ages, children's learning is still closely tied to concrete tasks, developmental staging, adult support, and direct experience. AI tools that talk warmly, remember past interactions, or appear to know the child may be harder

for young children to understand as tools rather than people-like partners. A screen answer may also seem more authoritative than it is unless an adult helps the child connect it to something they can explain or show in the real world.

- **Pre-adolescent learners, approximately ages 9–12:** Children in this age range are gaining independence with technology but are still developing the ability to judge whether information is accurate, incomplete, or misleading. They may know that AI can be wrong while still having difficulty recognizing when an answer is wrong or when the tool has done too much of the work for them.
- **Adolescent learners, approximately ages 13–18:** Adolescents are more able to question, compare, and evaluate information, but they also use AI more independently for schoolwork, decision-making, social interaction, and emotional support. At this stage, the developmental concern shifts from access to questions of trust, reliance, privacy, independent thinking, critical thinking, and whether AI use supports or replaces the skills adolescents are expected to build.

For more information on the impacts of AI on adolescents' well-being, see APA's recent [Health Advisory](#).

RECOMMENDATION 7: Make adult involvement a significant part of EdTech implementations because technology is most effective when learning is supported by human relationships.

Principle. *Educational technology tools can support learning, but children and adolescents learn best when adults are involved. EdTech tools are most effective when educators and families help learners use them, talk about what they are learning, and connect digital activities to learning at school, at home, and in everyday life. Technology can support educators and families, but it should not be expected to replace them. Supportive relationships foster belonging, psychological safety, and motivation, which help children and adolescents learn.*

Evidence

- **Young people learn more from EdTech tools when an adult is involved.** Children and adolescents might learn more from digital media when they use it with an adult than when they use it alone.^{110,111}
- **Young people do not automatically focus on the information that matters most for learning.** Attention is limited, especially for children and adolescents.^{112,113} Adults can help learners focus on important ideas and can explain unfamiliar concepts, answer questions, and distinguish between information that supports learning and features that are designed mainly to capture attention.
- **Young people learn more when they talk about what they are learning.** Explaining ideas, answering questions,

and building upon and connecting new information to what children and adolescents already know strengthens understanding and memory.^{114,115,116} Adults can support these processes by encouraging conversation, asking questions, and helping learners connect what happens on a device to experiences at school and at home.

Audience-specific implications

- **Educators:** Before adopting an EdTech tool, decide how you will help young people learn from it, whether by introducing new ideas, discussing what they are learning, or helping them connect digital activities to classroom work. Choose and use EdTech tools that strengthen your interactions with students and support your professional judgment, rather than replacing the relationships and instructional decision-making that effective teaching requires. If an EdTech tool is regularly used without any adult involvement, consider whether it is helping children and adolescents learn or simply keeping them occupied.
- **Families:** For younger learners, regularly join them while they use EdTech tools and talk about what they are doing and learning. For pre-teens and adolescents, ask them to explain what they learned, how they figured it out, and where they might use it in daily life.
- **Policymakers:** EdTech resourcing should include time, guidance, training, and support for the educators and families expected to help young people use them. Programs that assume significant adult involvement without providing resources may be difficult to carry out and may create greater challenges for schools and families with fewer resources.

RECOMMENDATION 8: Build tools and policies for access, flexibility, and different learner needs because average results can hide who is benefiting, who is being left behind, and who may be harmed.

Principle. *An EdTech tool that helps many youth may still work poorly for some. Evaluating a tool requires understanding how it works for children and adolescents with different needs, backgrounds, languages, abilities, and levels of support, not just whether it produces positive results overall. Fair access is not simply giving every learner the same device. It means making sure digital tools can be used effectively by the youth they are intended to serve.*

Evidence

- **Designs that make learning materials easier to use can improve access and participation, but gains in achievement are less consistent.** Young people are more likely to take part when materials offer multiple ways to access information, respond, and engage. Findings on academic



achievement are positive in some studies, but results vary across settings and groups of learners.^{117,118}

- **Tools designed for children and adolescents with disabilities and learning differences deserve especially careful attention.** Some supports, including text-to-speech, speech-to-text, captions, and translation, remove real barriers to learning and have a long history of effective use. New GenAI-based supports may help with tasks such as organizing work, understanding reading assignments, and expressing ideas in writing. At the same time, evidence for many of these newer tools remains limited, and marketing claims have moved faster than the research. Reported challenges include cost, limited teacher training, uneven access, and ethical concerns.^{119,120,121}
- **Positive results overall can hide who benefits and who does not.** Education studies often show that results differ across groups of young people. A tool may show positive results overall while some groups benefit less, show no improvement, or experience different effects.^{122,123}
- **Simply translating a tool into another language does not always make it equally useful.** The words, examples, instructions, and activities built into a tool may work differently for young people who speak different languages or come from different communities.^{124,125,126}
- **Access to technology outside school still differs by family income and community.** Students from higher-income families are more likely to report access to home computers, tablets, smartphones, and reliable internet. Students from lower-income households, Black and Latino/a/x students, and rural students are more likely to face barriers to completing schoolwork online at home.^{127,128}

Audience-specific implications

- **Educators:** A tool may appear successful when most students can use it, while creating obstacles for others. Look for patterns in who needs extra help, who avoids using the tool, who cannot complete assignments independently, and who stops participating. Those patterns can reveal design problems that are easy to miss when only overall class performance is considered.
- **Families:** If your child frequently gets stuck, cannot understand directions, needs frequent help to use the tool, or becomes frustrated before they can start learning, the problem may be the design of the tool rather than the child. Pay particular attention to whether the tool works well in your family's preferred language, on the devices available at home, and with the amount of support an adult can realistically provide.
- **Polymakers:** A tool should not be considered successful simply because it produces positive results overall. Ask whether it has been tested with learners who have different abilities, language backgrounds, reading levels, and levels of access to technology outside school. Support the implementation of technologies that decrease gaps between groups of students. Products that work well only under ideal conditions or with highly supported children and adolescents may not work as well when adopted at scale.
- **Developers:** Consider all possible audiences when building EdTech tools, prioritize universal design standards that allow for accessibility and availability of products to users with different abilities.

RECOMMENDATION 9: Protect data and privacy so learner data advances education rather than other interests.

Principle. Nearly every EdTech tool collects young people's data. The key question is not whether data are collected, but how data are used, who benefits, and what protections are in place. Data that help adults understand learning, provide support, and improve instruction can benefit children and adolescents. Data used primarily to increase product use, market products, or support commercial purposes require careful scrutiny.

Evidence

- **Data can help show when and why a learner is struggling.** EdTech tools can collect information about learners' responses, progress, and patterns of use. Studies of learning data indicate that this information can help provide more tailored feedback and identify where learners may need additional support. The effects are not the same for every learner, so the value depends on how the information is used.^{129,130,131}

- **The same information can be used for different purposes.** Data can support feedback, instruction, and research, but it can also be used for prediction, product development, marketing, or other purposes that may not directly benefit learners. This makes the purpose of data use central to understanding its value and risk.¹³²
- **Data can be studied while reducing privacy risks.** Some data methods allow researchers to study learning patterns and develop innovative learning technologies without sharing sensitive information. These methods can reduce the risk of identifying individual learners, but they do not replace the need for clear rules, limited access, and oversight.^{133,134,135,136}

Audience-specific implications

- **Educators:** Only require learners to create accounts for tools that strictly need them for learning. When selecting new tools, prioritize vendors that explicitly commit, in plain language, to not selling data, profiling learners for advertising, or using data for unrelated commercial purposes. If data collection, storage, or third-parties are included in the design and use of a product, ensure there is full transparency regarding where, who, for how long, and for what purpose. This information should also be shared with adult users and parents of minor users.
- **Families:** When using apps not provided by the school, treat "free" apps with extra caution, as they are often more likely to monetize data through advertising. Check





if the school has already vetted the tool for privacy; if not, avoid creating accounts or entering personal information unless you are certain of the data practices. If an app requires creating an account, consider if a “guest” or “anonymous” mode is available.

- **Developers:** Every piece of information collected about learners should have a clear educational purpose that can be explained in plain language. Learners, families, and educators should be able to understand what information is collected, how it is used, who can access it, and when it will be deleted. They should be able to easily opt out of data sharing. Data collected for learning should not become a resource for advertising, product growth, or unrelated business purposes.
- **Policymakers:** A checked box or signed consent form does not guarantee that a practice benefits learners. Ensure that the information collected has a clear educational purpose, that schools can limit or delete it, and that they can decide how long it is retained, whether it is shared with others, and whether the same educational goals could be achieved while collecting less information. Policies should protect learners while still allowing research that improves learning and teaching.

RECOMMENDATION 10: Invest in implementation supports and research that can keep pace with technology because technology adoption alone rarely improves learning.

Principle. *Buying a digital learning tool is not the same as using it well. Young people benefit when educators and schools have the training, planning time, support, and technology access needed to use a tool effectively. Decisions about digital learning tools also*

require better evidence about whether a product improves learning, how it compares with other strong approaches, and whether it works in the schools and communities where it will be used.

Evidence

- **Teachers need more than access to a tool to use it well.** Research on educational technology consistently finds that training, ongoing support, and opportunities to practice using digital tools are associated with more efficient classroom use. Brief or one-time training is less effective than support that continues over time.^{137,138}
- **Research does not always show whether a digital tool is better than other ways of teaching the same skill.** Many studies compare a new tool with what learners would normally receive rather than with another strong instructional approach. This type of comparison can make it difficult to determine which option leads to the greatest learning.

Audience-specific implications

- **Educators/ Policymakers:** Before approving a new educational technology, identify who will train educators, who will provide technical support, how families will be informed, how success will be measured, and how decisions will be revisited if the tool does not improve learning. Technology investments should include resources for implementation and evaluation, not just licenses and devices. Adoption should be viewed as the beginning of an ongoing improvement process rather than the end of a procurement decision. Schools should periodically review implementation and learning outcomes to determine which learners are benefiting, where challenges remain, and what adjustments are needed to improve outcomes.

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