The Future of Education

Enhancing the Learning Experience

Contents

Introduction

In the last five years, education has been changing in so many ways so quickly that it can be difficult to tell what all this upheaval will lead to. But in a broad sense, it is not hard to see that all these changes are pointing in one direction: increasing educational opportunities for all students.

Much of this can be accomplished through individualized learning, where each student's needs, learning style, and interests are combined to create a sort of personal curricula. If this result seems far away, consider how the following trends are making this idea closer to reality everyday.

The biggest change has been the increasing power, portability, and lower price for computers. From smartphones to tablets to Chromebooks to notebooks, more computers are in more students' hands than even before. Some schools are buying the machines while others are allowing students to bring in their own devices. Add to that the push to bring broadband into every school, via President Obama's ConnectEd proposal, and it's obvious that each of the above devices will be constantly connected to the Internet.

On the curricula side, the Common Core State Standards are calling for deeper understanding of key concepts and pushing schools to make sure students can apply these concepts to real-life work. Accomplishing this ensures that each student is either college- or career-ready by the end of 12th grade.

Class styles are changing, too. Less frequently, teachers are giving whole-class instruction where they parcel out information to students. More classes are now online or blended, which is a mix of online and face-to-face. Classes are also being "flipped," where teachers assign a video lecture for homework, and students use the class time to work collaboratively and apply the knowledge to various problems. Add in brain research that explains exactly how students learn and the data explosion that can tell teachers specifically which students understood her lesson before it's over, and the trend is more obvious.

Right now, this type of individualized learning happens mostly for special education students, as called for in their Individual Education Plans. But some leading schools are starting to put these forces together to create individual plans for each student.

Educators are finding that offering text to speech to all students leads to higher comprehension rates.

When this happens, Universal Design for Learning (UDL) becomes important. This type of differentiated instruction allows students to learn in their preferred style, choosing from a variety of tools. Students can be visual, auditory or kinesthetic learners, or combine all these methods in a mix that works for them.

A big part of UDL is text to speech. Again, this concept, having text-based materials read aloud for students, had been typically used for special education students who had trouble reading. But now, educators are finding that offering this service to all students is leading to more use than expected and higher comprehension rates.

Evolution of Classrooom Technology

At first blush, enabling UDL and individualized instruction in schools can seem like a free-for-all that demands a different learning plan for each child. But as you come to understand each of the changes mentioned in the introduction, you can see that moving to this type of program is a natural outgrowth of these advances.

The number of changes in the last several years have dwarfed that early progress. Apple unveiled its first iPad in April 2010, with the least expensive model costing $500. The next year Google introduced its first Chromebook, with the lowest model starting at $350 and the option of monthly payments for schools. Large one-to-one programs, such as Los Angeles Unified School District's plan to buy 650,000 iPads for students or Richland, South Carolina's decision to outfit 19,000 students with Chromebooks, prove that one-toone programs continue to grow.[1]

On top of these changes, Bring Your Own Device (BYOD) started to catch on in 2013, and more schools continue to encourage students to bring their own devices, allowing them to use their phones, tablets, and laptops while in class. For instance, consider Georgia's Forsyth County Schools' BYOD initiative. With 41,000 students, the district hosts 30,000 student-owned devices each day.

The number of technological changes in the last several years have dwarfed the progress of the last 30 years.

The Ubiquitous Internet

At the same time, schools have been increasing their online access. When the government's E-rate program started in 1994, it sought to help pay for schools to connect to the Internet. A full 20 years later, President Obama has called to overhaul the program. His newly named ConnectED aims to get 99 percent of all American K-12 schools connected to high-speed Internet access by 2018. The demand is certainly there. When the E-rate started in 1998, its funding was nearly $2.4 billion. Despite an increase in requests of 321 percent since then, its funding has barely risen by 5 percent.[2]

The combination of computing power in the hands of more students, with constant access to all the information contained online, has shifted the dynamic in the classroom. The teacher now can direct learning, allowing students to find and process information in their preferred format. Whole-class instruction is becoming a smaller part of each class.

Consider the changing nature of classes. Thirty-one states now offer full-time online schools, with 1.8 million K-12 enrollments in various types of online classes.[3] Schools are also "flipping" classes, where homework is done during class and students watch the lecture, either from their teacher or from another source. A school just north of Detroit, Clintondale High School, now flips all of its classes.[4] The results? The school cut its failure rate in various subjects by about 25 percent in just one semester.[5]

Or use the example of Khan Academy. Started in 2008 by Salman Khan, the site offers free video lessons in subjects ranging from math to science to art. In eight years, its library of videos has grown to 4,000. It reaches ten million students a month and has delivered 300 million lessons since it began.[6]

Each of these trends impact education, of course, but the real power comes when several of them are used together to create change. This is happening in two different ways right inside the state of Georgia.

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Individualized Learning in Action

Gwinnett County School System is the largest district in the state, serving nearly 170,000 students in 2013-14.[7] In 2010, the district won the prestigious Broad Prize as the top urban district in the country. When IBM wanted to test out a new system for education, it choose Gwinnett. In a program called Personalized Education Through Analytics on Learning Systems, IBM is trying to use data analytics and predictive modeling to remake education.[8] In this system, school officials will mix a student's past performance with predictive modeling data while considering the student's preferred learning method. This will allow teachers to grab specific content and particular teaching methods to customize education for each student. While IBM and Gwinnett have partnered on different projects for 15 years, this specific initiative was put in place right at the end of 2013.
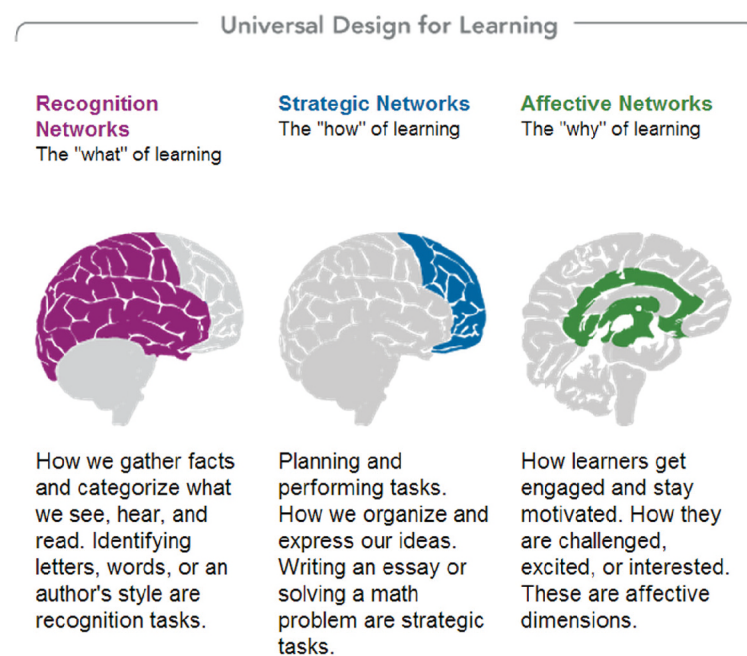
Nearby the metro Atlanta district sits Forsyth County Schools. Although they are taking a different path, their goal is somewhat similar to Gwinnett. Forsyth, using a nearly $5 million grant from the federal government, set up a new learning management system that could track each student. Then the district digitized its learning materials, from textbooks to staff-created lessons to digital learning databases.

By placing these digitized materials in the same management system, Forsyth allowed teachers to have choices for each learning objective they teach. Choosing an auditory lesson, versus a visual or wordbased lesson, for each student becomes easy. Forsyth, too, is in the early stages of rolling this system out, but even using some of these items, the district has been able to increase student test scores while decreasing its dropout rate.[9]

Understanding Universal Design for Learning

The concept of Universal Design for Learning is easy enough to understand, but what does it look like in a school, and how is text to speech a part of UDL?

UDL is a set of principles that provides an instructional framework for a flexible approach to individual learning needs. This differs from assistive technology (AT). AT is specifically about tools and devices that can help students with communication disabilities complete complex tasks and interact better with others.

Universal Design for Learning

Recognition Networks
The "what" of learning

Strategic Networks
The "how" of learning

Affective Networks
The "why" of learning

How we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks.

Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks.

How learners get engaged and stay motivated. How they are challenged, excited, or interested. These are affective dimensions.

UDL offers options to all students, allowing them to choose which tools fit them best, even customizing their learning paths.

While assistive technologies are effective, UDL flips the model by offering these benefits to all students, allowing them to choose which tools fit them best, even customizing their learning in different paths depending on whether they are trying to write an essay or solve a trigonometry problem.

Differentiated instruction is where the educator presents information differently to various students in the same classroom. Typically, this is done by placing students in smaller groups during class, based on learning styles, level of educational advancement, and other factors, such as earning disabilities or physical challenges. The teacher then crafts group-specific lessons, reading assignments, projects, evaluation methods, and ways of presenting information that fit each group best.

This allows students to enjoy the social experience of being in a large class with their peers, without the frustration or difficulty that often accompanies the "one lesson fits all" approach. Text to speech is a key part of both UDL and differentiated instruction, because it gives the teacher another choice to offer students.

For example, text to speech is a tool first used exclusively by special education students. For those with sight problems or disabilities that impaired their ability to read text, the usefulness is obvious. But today, publishers and school districts have begun adding text to speech to everyday learning tools, from textbooks to school websites.

When offered the chance to use this tool, some students whose profiles don't suggest they need text to speech, have discovered that it helps them retain information, either by replacing reading dense texts or by reinforcing what is learned through reading. Some students even combine the two, allowing text to speech to run while they read along. This is called bimodal learning.

Adding ReadSpeaker to Material

In the educational market, ReadSpeaker provides the benefits of its text-to-speech services to various educational segments. Schools such as Minnesota Infinity, Calgary Catholic, Georgia Virtual School, Gwinnett Online Campus, Anaheim School District, Clark County School District, The Virtual High School, Ccyber, and Southern Arkansas University Tech have integrated the ReadSpeaker services into their online programs.

Major LMS providers, such as Blackboiard, Moodle, Desire2Learn and Canvas, have found that the addition of text to speech helps their partnering institutions better meet the needs of all learners, and the ease of integration provides business advantages.

ReadSpeaker Integration Times
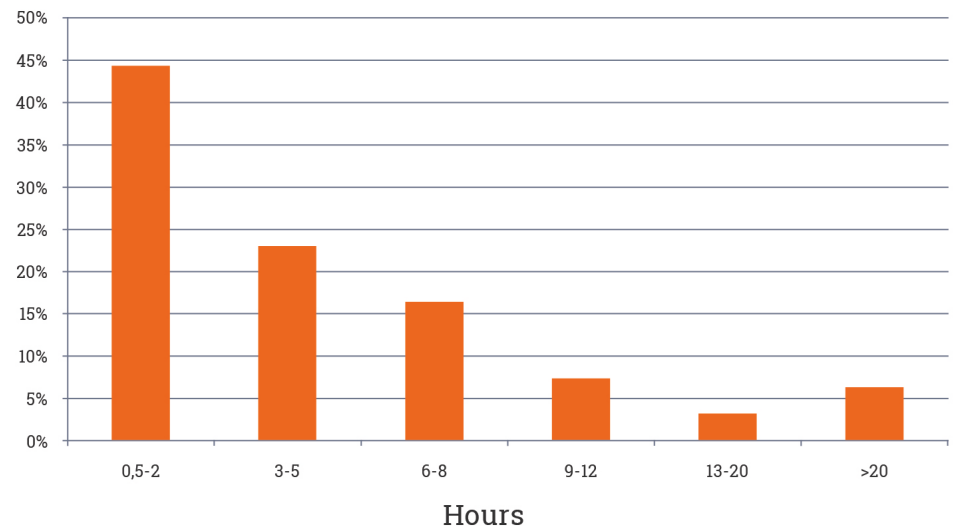
In the publishing area, many providers of educational content now see the addition of text to speech as a feature that customers expect, some of those publishers include Cengage Learning, EBSCO Publishing, CICERO Systems, Rosen Publishing, and Credo Reference.

John Knittel, vice president of technology for Rosen Publishing, explains why his company chose ReadSpeaker for its databases. Rosen is a 60-year-old publishing house that creates print and digital products for school and public libraries, including online databases in health, life sciences, physical sciences, digital literacy, and financial literacy. When Rosen moved into the digital space ten years ago, Knittel says the need for text to speech was "fairly obvious".

"The company chose ReadSpeaker for several reasons," he says. Its software was the best and matched the iOS system used on iPhones and iPads. Also, because Rosen's databases "are very dynamic, we're constantly changing content," he adds.

With ReadSpeaker, it's no problem to have new or updated articles covered by text to speech as soon as they are created. Plus, dealing with specialized and subject-specific vocabularies, "Rosen is picky about pronunciations," Knittel adds. ReadSpeaker pays attention to this, and the readers' voices are "excellent."

"ReadSpeaker offers one major benefit that tablets with built-in text to speech don't," says Tim Lovelace, ReadSpeaker's director of eLearning and publishing in the U.S. If a word is mispronounced on a tablet, there is no way for an educator to fix it. But ReadSpeaker can alter the pronunciation if needed. This feature alone could be key as more schools start to take their Common Core assessments online. "Educators can be assured that each word is announced correctly. Not all text to speech is created equal," Lovelace adds.

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Ease of Use and Better Technology

Adding the service to your school's website or teacher-created materials is easy, too. If you use templates consistently, the addition of a small piece of code can automatically enable all content to be read out loud. For instance, customers Cengage Learning and EBSCO each add thousands of articles a day, and text to speech is enabled for each new piece.

ReadSpeaker works on all browsers and all operating systems, and users don't need any special software or programs. The goal is for customers to have to do as little implementation as possible and for end-users to have to do nothing. It must be working because text to speech is the second highest used feature in Cengage and EBSCO's databases. Creating index cards is the top feature.

The methods used to create the automated voices have improved dramatically in the last several years, allowing the voices to sound much better than before. To make virtually all the sounds needed, humans are recorded reading a large number of phonemes; the software then stitches these together to make all the necessary words.

"What's interesting about it is that the way to make a voice sound better is not by making it sound perfect, but by making it sound more human," says Niclas Bergström, ReadSpeaker Founder and CEO. "We have made constant refinements that improve the quality."

Walt Tetschner, the publisher and editor of Asrnews.com, says, "Text to speech has made big gains in recent years, being used for GPS systems, to read emails to people who are driving, and even for writers who are proofing their work. Being able to hear your work read back to you can also help you edit." In fact, the Library of Congress uses the technology for that purpose.

Unlike translations, which occur word by word, ReadSpeaker's software builds its text to speech after considering the entire sentence, allowing it to get inflections correct and to accurately read some words that are spelled the same but pronounced differently, such as to read and having read material. Also, because the software is delivered through the Internet, schools and students can be sure to always have the most updated version available.

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The service is priced per activation. For a small publisher, an activation might cost a few cents, while for a larger publisher each user is a fraction of a cent.

While the idea of offering text to speech to students might be new to educators, most probably already have the service encoded in some of the databases they purchase. For other schools, the service is built into the learning management systems they use, such as Desire2Learn, Moodle, or Blackboard.

"In a few years TTS will almost become a requirement," Bergström adds.

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Virtual High School Case Study

All this theory about text to speech is sound and practical, but how does this work with students?

Storie Walsh, the director of instructional technology at the Virtual High School, is happy to explain. VHS is a 100% online group of classes started from a Federal Department of Education grant in 1996. Now a nonprofit, the school has grown to encompass 10,000 students in 32 states covering 700 member schools.

Courses are capped at 25 students per class, and schools that join can get 25 free student registrations if they donate a teacher to lead one online course. Most students take one to two classes online, either because the course isn't offered at their school or to avoid scheduling problems.

Even though VHS was one of the initial online schools, Walsh admits the school's model hasn't changed much. "All courses are instructor-led. There is lots of student-to-student interaction and teacher-to-student interaction. Teachers say they know their online students better than their face-to-face students because they have so much interaction."

At VHS, participation doesn't mean attendance, it means being active in discussion groups, as well as completing assignments. With some questioning the effectiveness of online classes and MOOCs, Walsh proudly points out that more than 80 percent of students successfully complete their VHS courses.

In 2011, the school decided to pilot adding text to-speech technology to six of its courses, ranging from biotechnology to environmental science to philosophy. The change was made for two reasons: the classes were text heavy and some had a number of students with IEPs. "The addition was an immediate hit," she says. While some students didn't use the service, those who used it really came to rely on it. "Ensuring that our courses are both multimedia-rich and suitable for all learners is something that is central to our mission," Walsh says. "ReadSpeaker was a natural fit because it gives all of our students an audio option."

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Increasing Usage

During the summer of 2013, VHS decided to enable text to speech in the vast majority of its classes, about 200 of those offered out of 220 courses.

"Due to improvements in the technology, it was easy to add the service to each class, taking just 15 seconds," Walsh says. Any changes happen at the server level, meaning the school always has the most up-to date version. "The only courses VHS does not offer the service in right now," she adds, "is its language courses." She hopes to add these classes in the future.

"Actually, foreign language courses are some of ReadSpeaker's most popular choices," says Lovelace. "ReadSpeaker is offered in 40 different languages, but that's not all. The company frequently offers different accents within a specific language."

For instance, within its English offerings, ReadSpeaker has a male and female version of a British accent, an Australian accent, and a North American accent. The company also offers seven different types of Spanish.

Unlike during the pilot, VHS didn't provide any training or even make an announcement based on the new service. Students and teachers noticed it on their own, and after one semester's use, many are now using it regularly.

After the courses got underway, Walsh sent out a notice in October alerting students and staff about the text-to-speech option. At the end of the 2013-2014 school year, she expects to ask about TTS in the school's annual survey.

The Benefits of Bimodal Learning

What surprised Walsh was exactly which students were using the service and how they were using it. Because students are able to download the audio in MP3 files and listen to them even if offline, she expects that a number of them do so when walking around or traveling in a car or bus. But for reading in general, she found the service "an awesome opportunity to leverage existing assets in new ways. I found a benefit to the wider audience from the beginning." The top 10 courses where TTS was used include criminology, meteorology, mythology, AP Computer Science, and AP Psychology.

Studies prove that students remember material better when they listen to it as they read along.

Several students mentioned to her that having the dual modality of reading the text while listening to the it allowed them to better remember the material. During the pilot, Walsh says teachers appreciated the service for students who had trouble reading English, ranging from a student from China to other students who have trouble reading English.

This backs up several studies that have looked at bimodal learning, where students read a text while hearing it read out loud. Research shows that students who listen and read at the same time have improved word recognition skills and vocabulary, improved comprehension, fluency and accuracy, and better recall of the material.[10][11]

Other benefits included increased motivation among learners and enhanced confidence reading.[12] A 2002 study showed that while learning in a bimodal format, reading fatigue was reduced, allowing students to increase their reading endurance.[13]

Two studies also showed that bimodal presentations help poor and struggling readers more than it did for average to skilled readers.[14][15]

Conclusion

The results are clear. Major changes are happening in education, from computing power and mobility to Internet connectivity to the standards that children learn. Each of these trends help make schools better equipped to create universal design for learning in their classrooms.

These changes also make it easier for teachers to give individual attention to each of their students, in some cases picking material specifically for them. Within all these trends, text to speech is a major part, helping to offer schools the flexibility of offerings they desire while appealing to students in exactly the way they want to learn.

While many of these trends are just starting to come together to realize this vision, more schools from around the world will continue to show this progress and with it, better engaged students who boost their own learning.

ReadSpeaker Clicks per Year - Education Segment
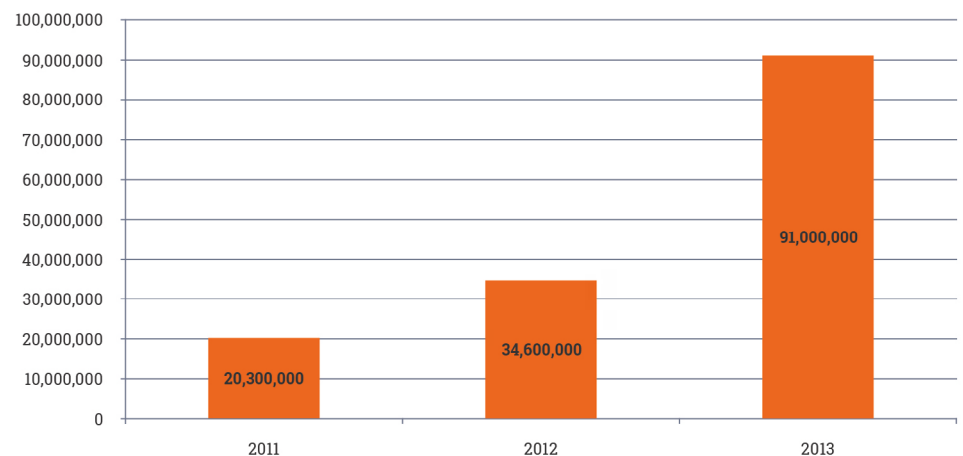
The progress in schools around the world will continue and result in better engaged students who boost their own learning.

Resources

Evolution of Classroom Technology

1. Richland School District Two, Columbia, South Carolina.
   https://docs.google.com/file/d/0B__OTXR_
   u3RbZHl0Y3dtdVpwLWs/edit

The Ubiquitous Internet

2. E-rate Facts, Scholastic Administrator, Late Fall 2013.
   http://www.scholastic.com/browse/article.jsp?id=3758292

3. Fast Facts About Online Learning, The International
   Association for K-12 Online Learning, February 2013.
   http://www.inacol.org/cms/wp-content/uploads/2013/04/iNACOL_
   FastFacts_Feb2013.pdf

4. Clintondale High School
   http://www.flippedhighschool.com/ourstory.php

5. Turning Education Upside Down, NY Times, Oct. 9, 2013.
   http://opinionator.blogs.nytimes.com/2013/10/09/turning-
   education-upside-down/?_php=true&_type=blogs&_r=0

6. Khan Academy
   http://khanacademy.desk.com/

Individualized Learning In Action

7. Gwinnet County Public Schools
   http://publish.gwinnett.k12.ga.us/gcps/home/public

8. IBM and Georgia's largest school system bring personalized
   learning to life, Dec. 17, 2013.
   http://www-03.ibm.com/press/us/en/pressrelease/42759.wss

9. Forsyth County: Success! (After Two Failures), Late Fall 2013
   http://www.scholastic.com/browse/article.jsp?id=3758273

The Benefits of Bimodal Learning

10. Mastroberardino, S., Santangelo, V., Botta, F., Marucci, F. &
    Belardinelli, M. O. (2008) How the bimodal format of presentation
    affects working memory: an overview. Cognitive Processing, 9(1),
    69-76.

11. Wise, B., Olson, R., Ansett, M., Andrews, L., Terjak, M., Schneider, V., Kostuch, J., & Kriho, L. (1989) Implementing a long-term computerized remedial reading program with synthetic speech feedback: Hardware, software, and real-world issues. Behavior Research Methods, Instruments, and Computer, 21, 163-180.

12. Hecker, L., Burns, L., & Elkind, J. (2002). Benefits of assistive reading software for students with attention disorders. Annals of Dyslexia, 52, 243-272.

13. Disseldorp, B., & Chambers, D. (2002). Independent Access: Which students might benefit from a talking computer? In Untangling the Web-Establishing Learning Links: Proceedings of the Australian Society for Educational Technology International

14. Shany, M. T., & Biemiller, A. (1995). Assisted reading practice: Effects on performance for poor readers in grades 3 and 4, Reading Research Quarterly, 30(3), pp. 382-395.

ReadSpeaker 🔊

pioneering voice technology

ReadSpeaker is a global voice specialist providing dozens of languages and lifelike voices. Using its own industry-leading technology, the company delivers some of the most natural-sounding synthesized voices on the market. ReadSpeaker uses next-generation Deep Neural Network (DNN) technology to structurally improve voice quality at all levels. ReadSpeaker is a subsidiary of the Memory Disk Division (MD) of the HOYA Corporation, with offices in 15 countries, and over 10,000 customers in 65 countries, providing a complete text-to-speech (TTS) offering, both as Software-as-a-Service (SaaS) and as licensed solutions. A fully integrated TTS provider, ReadSpeaker encompasses all of HOYA's state-of-the-art technologies (NeoSpeech, Voiceware, VoiceText and rSpeak), providing a wide variety of applications for varying channels and devices in multiple industries. ReadSpeaker gives a voice to businesses and organizations for online, embedded, server or desktop needs, apps, speech production, custom voices and more. With more than 20 years' experience, the ReadSpeaker team of experts is leading the way in text to speech. ReadSpeaker is "Pioneering Voice Technology".

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