Leveling the Playing Field with Microsoft *Learning Tools*

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EXECUTIVE SUMMARY

*If you design things for the greatest access—Learning Tools is like that—**it makes everything accessible to all**, and why wouldn't we want that?*

-4th Grade Teacher

This study was designed to evaluate whether Microsoft *Learning Tools* is useful for enhancing reading and writing instruction and learning. Four 4th grade and four 6th–12th grade teachers from Bellevue School District in Bellevue, Washington participated. We interviewed them and analyzed reading assessment data to gain an initial understanding of whether the product supported learning. Results indicate overall that *Learning Tools* appears to be a useful digital tool for supporting not only reading, but also writing and other skills for elementary, middle and high school students, who range from struggling to above grade-level in their skills. Moreover, for struggling readers, *Learning Tools* "levels the playing field" by supporting access to learning materials beyond their reading skills.

Learning Tools is a set of features included in Microsoft OneNote, Word, Outlook, Office Lens iOS, and Edge Browser, available for free as part of O365. It was designed using research-based strategies to support reading and writing skills for people of all ages.

Learning Tools improves reading comprehension for Elementary, English Language Learner and Special Education students

A key finding in our study is that *Learning Tools* supports reading comprehension across grade levels and abilities. For the 4th graders in our study, they showed significantly greater gains in reading comprehension, as measured by their STAR scores and percentiles, than their historical peers, accounting for baseline reading comprehension and other important variables such as first language. **The *Learning Tools* students showed an average gain of 123.6 points in their STAR scores, compared to the historical group's 89.2 points, and an average gain of 10 percentile points, while the comparison group dropped by 0.62 points.** Teachers observed that having text read aloud to their students, regardless of grade level or reading ability, helped readers to focus on the ideas in the text. For struggling readers, features such as highlighted words and word spacing, the pacing of the voice, the gender of the voice, background color, font size, and parts of speech helped to improve reading mechanics.

Learning Tools improves writing

The teachers in our study quickly identified how the Dictation tool and the Immersive Reader could be combined to support and improve writing skills. The 4th grade teachers had students dictate their writing and have the Reader read it back, which helped students identify errors. They intentionally built *Learning Tools* into their capstone writing project and one teacher claimed that as a result, she saw better revisions and final products than she had seen in her four years with the project. Hearing their own writing was a "game changer" for building students' writing skills.

Learning Tools provides greater equity through access to learning materials

Perhaps the most compelling finding in this study is that *Learning Tools* "levels the playing field" for learners. Education policy is currently focused on ways in which schools can close opportunity gaps and support equity in education. Educational tools that can facilitate access to content that is at or above grade level, despite below-grade-level reading and/or writing skills, are particularly promising. In this study, using the Immersive Reader and the Dictation tools helped students overcome limitations in reading and/or writing skills to engage in course materials at higher levels and in other content areas like math, science and social studies. In the words of one of the 4th grade teachers in this study, *"If you design things for the greatest access—Learning Tools is like that—it makes everything accessible to all, and why wouldn't we want that?"*

Learning Tools supports important learning processes

Teachers found that *Learning Tools* supports cognitive processes that improve learning. The software supports multi-modal learning via audio, visual, and tactile features. It also gives personal choice and control to learners which impacts their engagement. Students chose the reading voice, pace, background color and font, the spacing of words, and more. At all grade levels, teachers observed that these features gave students a sense of control and responsibility for their learning. Additionally, teachers could personalize learning for their students by facilitating access to a wider array of reading materials through the Immersive Reader. The expansion of materials helped teachers find content aligned with their students' interests, at comprehension levels that were challenging and previously inaccessible.

Learning Tools supports non-cognitive processes

Teachers in our study connected the use of *Learning Tools* with "non-cognitive" processes and skills that have been associated with college and career success. Through using *Learning Tools*, students "learned how to learn" by connecting the features with multiple strategies for supporting learning, and understanding the need for more than one way to learn. Teachers valued how *Learning Tools* supported independent learning, which teachers connected to academic confidence, motivation and engagement.

BACKGROUND

Education leaders want shorter turn-around studies that provide more timely information and address practical questions about education technology.

*As a teacher, the benefit of having, it's one more piece that I feel is giving my kids access and taking pressure away from me for coming up with an alternative for that student that might not be able to read the material. So I think there's a huge benefit in that. **And the dream is to give all the kids access to the same material...***

-Secondary Teacher

In this report, we focus on Microsoft's *Learning Tools*, a promising digital tool for teachers to support student-centered instruction for reading and writing. Learning science tells us that how much we learn is influenced by our motivation to learn. Tasks that are novel, not too difficult and not too easy, relevant to personal interests, and that give us choice and control, stimulate our motivation to learn. [1,2,3] These are the key principles of student-centered instruction.[2,4,5] Student-centered instruction is correlated with higher student participation and motivation to learn, as well as improved learning and achievement.[6,7,8] In this report, we focus on Microsoft's *Learning Tools*, a promising digital tool for teachers to support student-centered instruction for reading and writing. We studied an implementation in targeted classrooms within Bellevue School District in Bellevue, Washington to measure the impact of *Learning Tools* on reading comprehension, and on teachers' perceptions of its utility for supporting instruction and learning.

> *Learning Tools is an empowering tool. Sometimes students' performance doesn't match their ability. It evens the playing field for kids who are struggling readers. It helps them to feel like they have a grasp on their education, on their learning. It allows them to feel more like independent learners, not depending on the teacher, not depending on peers.*
>
> **-4th Grade Teacher**

When considering what to look for when adopting education technology for educators and students, education leaders acknowledge that intensive, rigorous studies are often not practical for providing timely information for decision-making. [9] Education leaders from leading U.S. states and districts in a panel at SXSW[1] this year, reported leaning on shorter turn-around studies that provide more timely information and address practical questions about education technology, such as:

- **Is it going to work?**

- **Under what conditions, and in what learning environment, does this product work?**

- **With which group of students does the product work?**

- **At what cost?**

- **Is the product better than what teachers were doing before to advance student learning?**

- **And how easy is it to use?**

We structured this report to share what we learned about *Learning Tools* from quantitative data and interviews with educators, to address these questions and provide information that can be used for decision-making about whether this technology can be useful for supporting teaching and learning in interested schools and districts.

[1] SXSW or South By Southwest is an annual event in Austin, Texas focused on creativity and innovation in technology, film and music. The conference often features sessions focused on education technology.

What is *Learning Tools*?

Learning Tools is a feature of Microsoft OneNote (Desktop and Online), Word (Desktop and Online), Outlook, Office Lens iOS, and Edge Browser. It is either part of Office 365 (including Desktop), Windows 10, or it is available online for free (see Table A1). The primary feature of *Learning Tools* is the Immersive Reader, which was developed based on literacy science, to improve reading comprehension. The Immersive Reader displays text in a format that helps the reader to follow along as it reads the text aloud, word by word. Each word is highlighted as it is read aloud. Students can manipulate settings, such as the pace of dictation, text size, and spacing between words. They can change the reading voice and the background color too, which as some teachers in our study observed, gives students "ownership of their learning." The Immersive Reader has a grammar component as well that highlights nouns, verbs and adjectives, and students can break down words by syllables. Teachers in this study found these features to be helpful to their students for reading as well as writing. *Learning Tools* can accommodate text in a variety of formats including PDFs, text typed in OneNote, screen shots from the internet, scanned books, and other resources, as long as the text display is clear. Figure 1 shows examples of the Immersive Reader screen in OneNote (left) and Word (right).

The Dictate tool is another popular feature of *Learning Tools*, which helps students to translate speech to text. Students need a microphone (headsets work best) and a quiet place to work with little background noise. Students can insert punctuation by saying it aloud, e.g., "comma." Teachers in this study used the Dictate tool to build writing skills. See Appendix A for additional information about *Learning Tools*.

Our Study

In Fall, 2016, we engaged with Bellevue School District to study the use of *Learning Tools* for improving reading and writing. The district serves more than 19,000 students, speaking more than 95 languages and representing more than 100 birth countries. About 20% of the students qualify for Free/Reduced Lunch, and about 12% qualify for English Language Learners programs. Most students are either White (40.2%) or Asian (36.2%). In this district over 70% of students met or exceeded English Language Arts (ELA) and/or Math standards in 3rd, 5th, 7th and 8th grade—above the state average.[2] The district has a one-to-one initiative in which all 6th–12th grade students are assigned a laptop to use at school and at home.

FIGURE 1. IMMERSIVE READER SCREENS IN ONENOTE AND WORD.

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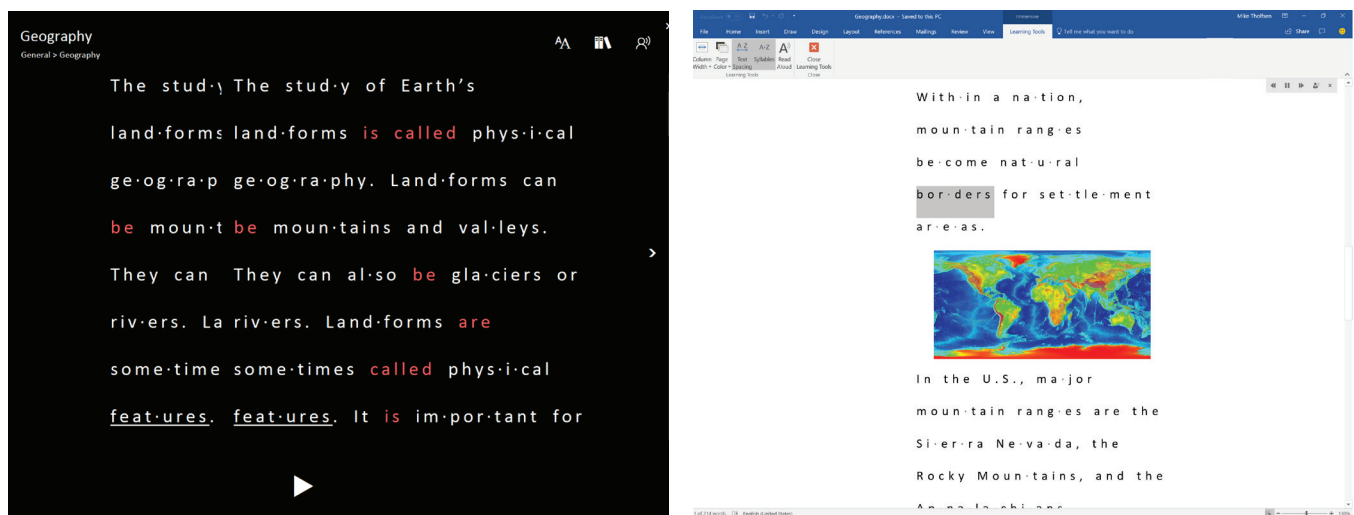
[2] The state average in math ranged from a high of 57% (in 5th grade) to a low of 46% (in 8th grade) and in ELA, a high of 57.6% (5th grade) and low of 52.1% (3rd grade) scoring at or above proficiency.

STUDY DESIGN AND PARTICIPANTS

Eight teachers participated in a study of *Learning Tools* to help inform decision-making in their district. Four taught 4th grade at the same elementary school, and four taught at the secondary level. The secondary teachers taught grades 6–12 and worked with struggling students.[3] All eight of the teachers were trained in how to use *Learning Tools* software with their students, using laptops furnished by the district. The training focused on the Immersive Reader. The teachers were free to use *Learning Tools* however they chose with their students during the Spring, 2017 semester.

To evaluate whether *Learning Tools* had an impact on students' reading comprehension, we used a standardized reading assessment given to all 2nd–8th grade students in the district. The district has implemented STAR as an online reading assessment since the 2012/13 school year to monitor student progress. STAR is nationally normed and targets grades K–12. The district administers the STAR every Fall and Spring.

We used STAR data for 4th grade students from previous years and from the same school, as a comparison group for the *Learning Tools* students. The logic behind this design was that a historical group of students from the same school had a higher probability of being demographically similar and receiving essentially the same reading curriculum, but without access to *Learning Tools*. We focused on 4th grade STAR data from the 2013–14 to 2015–16 school years for the comparison group, and the STAR data for the 2016–17 school year for the *Learning Tools* group. There were no standard reading assessment data available for the secondary classrooms, so they were not included in the quantitative analyses.

In addition to the STAR data, we interviewed the eight participating teachers about how their students used *Learning Tools*, and the perceived challenges and benefits of using the software for teaching and learning.

DATA ANALYSIS

Our statistical analyses focused on measuring growth in reading comprehension from before and after students used *Learning Tools*. We used the Fall STAR data as a measure of baseline reading comprehension for the *Learning Tools* and historical comparison students, and evaluated the difference from the Spring STAR data as the measure of growth. Because growth can be influenced by where students start, as well as other factors, we statistically controlled for those influences in our analyses (see Table 1).

TABLE 1. FACTORS INCLUDED IN STATISTICAL MODELS OF GROWTH IN READING COMPREHENSION

Baseline reading comprehension (Fall STAR score)
Ethnicity: Asian, Black, Hispanic, White
Gender
Special Education status (yes, no)
English Language Learner (yes, no)
S504 status (yes, no)
Gifted candidate (yes, no)
1st language/language spoken at home (English, non-English)

We identified 213 comparison students from the historical cohort who had both Fall and Spring STAR scores. The *Learning Tools* classrooms had 100 students, but only 64 had *Learning Tools* usage data. Of those 64, 52 (or 81%) had both Fall and Spring STAR scores. These students are described in Appendix B.

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[3] Three of the four teachers worked with students in Special Education, some of whom were classified as struggling readers and/or had emotional or behavioral issues.

RESULTS

Based on our analysis of STAR data and interviews with teachers, *Learning Tools* appears to be promising technology for supporting and enhancing reading, writing, 'non-cognitive' factors and access to content that readers otherwise struggle to comprehend.

*...with Learning Tools, the fact that they were using the Immersive Reader and listening to their writing multiple times—**the papers that I received this year were the BEST papers that I've gotten in my 4 years of doing this***.

-4th Grade Teacher

Do *Learning Tools* Work to Improve Learning Outcomes?

READING COMPREHENSION

We analyzed change in reading comprehension for the 4th grade students using *Learning Tools*, compared to a historical cohort of 4th graders from the same school who did not get *Learning Tools* in their reading curriculum. Our analyses indicated that the students who used *Learning Tools* had significantly more growth in reading comprehension compared to the historical cohort, taking into account factors we know are related to reading comprehension (see Table 1, p. 11). Figure 2 shows the average change in STAR scores from Fall to Spring for the historical cohort and the *Learning Tools* students.
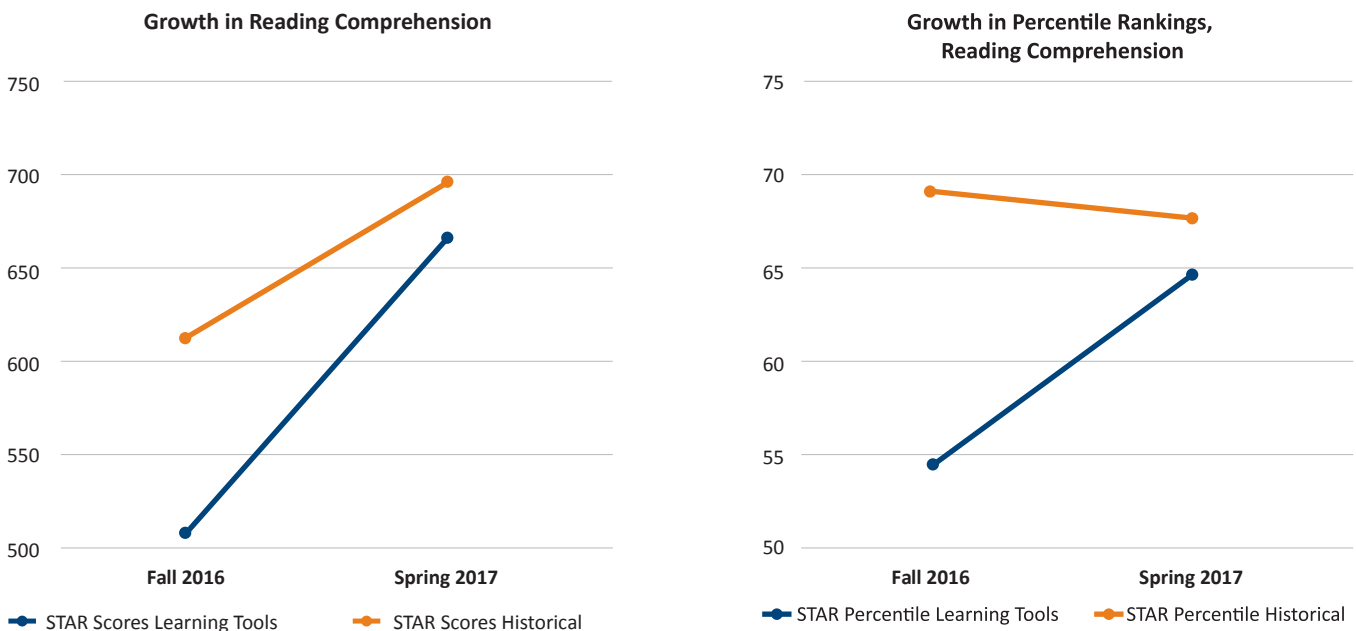
As Figure 2 shows, the slope for the *Learning Tools* students is steeper, showing statistically significantly greater growth, on average, from Fall to Spring in reading comprehension. **Learning Tools students gained an average of 123.6 points over the school year while the comparison group gained an average of 89.2 points.** Shifting to percentiles, the *Learning Tools* group again showed greater growth on average than the historical cohort. The comparison group started at the 69th percentile in the Fall and showed a slight drop to just below

the 68th percentile in the Spring, while the *Learning Tools* cohort started just below the 55th percentile and grew to the 64.7th percentile in the Spring.

These results look promising. But it is important to note that although the *Learning Tools* group showed significantly greater average growth than the historical cohort, their final average Spring STAR scores and percentile rankings remained lower. The district noted that over time, they've had increasingly more English Language Learners and students in Special Education (see Table B2, Appendix B), which may account for the lower STAR scores in the 2016–17 school year. Although they started at a lower level, it is encouraging that the *Learning Tools* group did see larger gains in reading comprehension than their historical peers. But it is important to regard the results with caution. Statistically, starting at lower levels offers the opportunity for greater growth. Additionally, with our study design, we could not control for differences in reading instruction between the historical and the *Learning Tools* cohorts, and therefore we cannot claim that the growth was due to the use of *Learning Tools*. About half

FIGURE 2. GROWTH IN READING COMPREHENSION FOR *LEARNING TOOLS* VS. HISTORICAL COHORT

Growth in Reading Comprehension

- STAR Scores Learning Tools
- STAR Scores Historical

Growth in Percentile Rankings, Reading Comprehension

- STAR Percentile Learning Tools
- STAR Percentile Historical

of the teachers we interviewed hadn't much time to make *Learning Tools* more a part of their students' learning routines. Yet their positive reports about the perceived impact of *Learning Tools* on their students' reading and writing suggests it is plausible that it could have played a part in their students' accelerated growth in reading. The following examples illustrate teachers' impressions of the impact of *Learning Tools* on their students' reading comprehension.[4]

TABLE 2. READING COMPREHENSION OUTCOMES OF *LEARNING TOOLS*

OUTCOME	GRADE	BENEFITS OF *LEARNING TOOLS* (QUOTES FROM TEACHERS)
Improves reading comprehension	**4**	It's never a bad thing to listen to something being read to you, because you can pull more out of it.
		Being able to listen to it lets students focus on 'what did I hear? What ideas keep coming up?'
	6–12	For reading comprehension, repeating passages is very helpful…
	11-12	It seems to me one of the best ways for students to improve their reading comprehension is to be read aloud to while they follow along…While using the Immersive Reader, students could make connections between the words they're hearing and seeing on the page, thus improving ability to read and comprehend text…I see their comprehension improve when they're being read to…students sat there silently listening, and the students who paid attention were able to answer their questions about the reading much better…This student who typically struggled with comprehension seemed to understand it better, got more out of it by having it read out loud. It was like "oh, he noticed that, huh?" And that student volunteered to answer, which was not the norm for him…and their STAR scores have gone up since January [since using LT in the classroom].
		I think when we hear things auditorily, it's easier for us to retain and state that meaning, vs. when we read it and try to say it…It appears in their ability to articulate it…because they've already heard it.

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[4] For descriptions of how the teachers used Learning Tools to support student learning and success, please see Appendix C.

WRITING

It was primarily the 4th grade teachers who used *Learning Tools* to support writing. At their school, they have a writing capstone project in social studies which culminates in a 5-paragraph essay. The 4th grade incorporated *Learning Tools* into the project, using the Immersive Reader to read aloud student drafts. Teachers found the software to be particularly effective in helping students identify grammatical and structural problems with their writing, and to motivate them to do their revisions. As one teacher enthusiastically reported, her students' writing drafts were better than she had seen in her four years of working on this capstone project. Goals including learning writing structure and editing and revising writing. The following summarizes the teachers' perceptions of the benefits of *Learning Tools* for writing:

TABLE 3. WRITING OUTCOMES OF *LEARNING TOOLS*

OUTCOME	GRADE	BENEFITS OF *LEARNING TOOLS* (QUOTES FROM TEACHERS)
Improves writing	4	The biggest benefit I've noticed is with the writing…they seem to be more motivated to revise and edit than they have in the past. Usually it's pretty hard to get a 9 or 10 yr old to revisit their work… They write that 1st paper & they think they're done. But like I said, being able to listen to it, and they realize 'oh, I can really see some ways to make this better, I can see my mistakes' seems to really motivate them to revise their writing more…
		I've seen a drastic change in their writing…The capstone project has been a paper that our 4th grade team has not been really looking forward to because it's so challenging and there's so many parts to it. And the paper ends up sounding choppy because they have to cover so many sections and really explain their learning. But with *Learning Tools*, the fact that they were using the Immersive Reader and listening to their writing multiple times—the papers that I received this year were the BEST papers that I've gotten in my 4 years of doing this. I've had some pretty high performing groups, but I can definitely say that the *Learning Tools* definitely helped. Because when I first had them do their draft on a piece of paper, I read through it, and I saw that it looked about the same as most years. But when they shifted to typing it and using the Immersive Reader, there was this huge jump in performance. And I really think *Learning Tools* played a big role in that.
		Pretty much all my kids, even my high performers are like 'I've caught so many mistakes that I've made—listening to it really helps!' So it's been a really great tool in that sense …Making sure their draft was solid, no improper sentence structure…
	6–12	What's called correct-word sequencing…*Learning Tools* does the autocorrect which provides an example to students of how it should look, mostly correctly…that helps them practice editing a piece of work…I do see some greater production in written output…

LEARNING PROCESSES

Teachers also used *Learning Tools* to support cognitive processes that researchers have linked to improved learning. Examples from teachers in this study include reducing stigma—which creates a safer place to learn—and engaging multiple modes of learning:

TABLE 4. LEARNING PROCESS BENEFITS OF *LEARNING TOOLS*

LEARNING PROCESS	GRADE	BENEFITS OF *LEARNING TOOLS* (QUOTES FROM TEACHERS)
Helps struggling readers from feeling stigmatized	4	Some of my struggling students seem more willing to read with *Learning Tools*…Sometimes when we have struggling readers in class, it can be pretty obvious that they are struggling readers, because the typical 4th grader might be reading a book that's 200 pages and they're reading a book that's 20 pages. I feel like the *Learning Tools* sort of evens the playing field—no one really knows what you're reading and what level it's at…'Oh it's reading time, so I'm going to put on my headset just like everyone else.' It seems to be making everything a little more equal.
	6–8	To have one more way to access that information [content that students otherwise can't access due to lower reading level] that's discrete—I think that's huge.
Promotes engagement, engages reluctant readers and writers	4	They think it is pretty cool that they are able to turn this on and listen to their own writing. So I'd say the level of engagement is very high…
	4	For the writing, my students were more eager to play back their writing, so that revision part, they were more eager to participate.
	9-12	I had two students who were reluctant to read in my class. They were exposed to *Learning Tools* in their Reading Lab and in my classroom. The Immersive Reader was helpful to them: they liked being read to…
Engages multiple modes for learning (auditory, visual, tactile)	4	Some kids learn visually, some auditorily, and then there's the whole tactile piece with the typing. It's reinforcing access points for kids' learning.
	4	When they're writing, they can hear it as well as see it. Same with during reading. I think they like having a tool that when they're struggling, can help them to be successful.
	11-12	…the multi-modal approach: that's part of the accommodations for these students to increase comprehension; that's what the Immersive Reader helps with…
Promotes personalization of learning	4	Everybody has different learning styles; what I think this can do is help kids access their learning in the way they learn best…
	4	…and they can change the size of the text and the color and all that, so it's theirs, and they're tailoring for their own use and their own learning…
	4	They love that there are a lot of options: you can have it go at a different pace, you can pick the font and the background colors. I think having those options empowers them [to personalize the software for to their own liking]. It's something they enjoy, they look forward to it.

"NON-COGNITIVE" SKILLS

In today's K-12 schools, there is widened interest in the "non-cognitive" processes that help students to be college and career ready. In our study, teachers reported the benefits of using *Learning Tools* to foster growth in a number of these "non-cognitive" areas. Examples include:

TABLE 5. NON-COGNITIVE SKILLS BENEFITS OF *LEARNING TOOLS*

NON-COGNITIVE SKILLS	GRADE	BENEFITS OF *LEARNING TOOLS* (QUOTES FROM TEACHERS)
Promotes independence and ownership of learning	4	*Learning Tools* gave them the option about 'how do I want to tackle this assignment?' And anytime you can give kids that option about how they want to take on the work, they'll be more engaged. Also, it meant they could do it at their own pace…
		[*Learning Tools*] is a ready, electronic resource for [students]…and they can load things in, and they can listen to it…and they sort of take charge of that learning…I want them to be independent learners and this is one way to help them.
		Learning Tools is an empowering tool…It helps them to feel like they have a grasp on their education, on their learning. It allows them to feel more like independent learners, not depending on the teacher, not depending on peers.
		Also, it meant they could do it at their own pace, without knowing where their neighbor was at or where I was at. Just knowing that they had to do this assignment by this time…
Learning how to learn: using multiple strategies	4	Kids need to know they have multiple tools for learning. Letting them know that *Learning Tools* is a tool they can use for reading and writing is very helpful.
	11–12	Being able to identify 'I need help with this assignment, I need something extra, what are the tools that are available to me, how can I choose the appropriate one?'
Increases academic confidence	4	I think *Learning Tools* has empowered several of my students as far as their confidence level. I have a girl who struggles with reading and spelling in my class, so I have her use the Dictation piece and have it read back to her using the Immersive Reader, and her confidence level has really increased. So that has been an amazing experience to see that and a fabulous experience for her as well.
	6–8	It's one more shot in the arm [for struggling readers]. 'I can do what everyone else is doing, I'm not limited, I no longer have to wait for someone to read to me.' The confidence to access materials like their peers around them is always going to be a confidence booster.
	11–12	In the Gen Ed classes, I have noticed that when I set up the reading…in the Immersive Reader instead of independent reading, when we've gone back and had discussions about the materials read, they've participated more actually…they were volunteering more answers.

GREATER EQUITY THROUGH ACCESS TO LEARNING MATERIALS FOR ALL

Nearly all of the study teachers mentioned how *Learning Tools* enabled their readers, regardless of skill level, to access content aimed at a higher reading level. In this case, "access" means comprehension of content that had previously been unavailable because the reading level was too high. Struggling readers had content read aloud in the Immersive Reader and were able to join their peers through exposure to the same grade level content in reading as well as other content areas, like math and science. Creating equity through access to learning materials is where *Learning Tools* could be of greatest benefit.

TABLE 6. EQUITY BENEFITS OF *LEARNING TOOLS*

BENEFITS	GRADE	USE OF *LEARNING TOOLS* (QUOTES FROM TEACHERS)
"Levels the playing field" by providing equal access to course content for struggling readers	4	Great way for my students to access content that was above their reading level. They're able to comprehend it if they can hear it when the text levels are too high. So I thought this is a way to even the playing field.
	6–8	The Immersive Reader gives students one more tool they can use to access more difficult material…In science this year, we're piloting a program called Amplify and it's all digital. So my students who don't have very high reading levels have to access that curriculum on the screen. And knowing that it's all in OneNote, it's all dumped into the OneNote form, so they can use the reader to even read thru some of the passages in their science curriculum is a HUGE improvement…
		Any time they can access listening as a way to access material that other kids are able to read just levels the playing field. I have an interesting student who is about 13 years old and reads at about the equivalency of a 1st or 2nd grader. However, I've read him numerous novels…and his mind is so complex. He is able to recall things and able to comprehend some of the highest level text; he's able to make inferences…But you ask him to read a sentence and it's a difficult struggle—he's still trying to sound out letter sounds. So for a guy like that, this kind of a tool is extraordinary…He's in a science and technology class right now and he has access to all of that material. Anything that is on OneNote, he listens to it and he's participating along and he's creating all the things he needs to create in his tech class. But if it was left to him to literally interpret the letters on the page, there's no way, no way. He'd either have to have someone read it to him, which as an 8th grade boy is humiliating, or he'd have to not do it. So I feel like *Learning Tools* is a gift, for those kids who have all the pieces but cannot decode those words on the page.
Provides enrichment activities for at-or-above grade level readers	4	When I first heard about *Learning Tools*, I thought they would only be helpful with my struggling readers or my English Learner students. But as I got to know the *Learning Tools*, I realized they could be helpful for all the students in my classroom…I discovered I could push out articles to my General Ed students that were above their grade level as well. And it was a way to help extend them.
		With *Learning Tools*, you can cover a lot more ground because you can pull whatever you want into it, whether it be articles or snippets of text or their own writing. It's a fabulous program!

IMPLEMENTING *LEARNING TOOLS*

Learning Tools is available on any education device with OneNote Desktop or OneNote Online, Word Desktop or Word Online, Outlook Online, or the Edge Browser (ePub, PDF, or on any web page). OneNote Desktop, Word Desktop, Edge ePub, and Edge PDF do not need an internet connection.

*Teachers unanimously reported that **Learning Tools is easy for them and for their students use***.

Under what conditions, and in what learning environment, does *Learning Tools* work?

Interviews with the teachers indicated that they believed *Learning Tools* is useful in a variety of learning environments and conditions. In Bellevue School District, they have a one-to-one initiative (one device per student), where students are assigned a laptop to use at school and to bring home. Each laptop had Microsoft OneNote with *Learning Tools* added on. However, *Learning Tools* can also be accessed using a browser. For those without internet access, *Learning Tools* works offline with OneNote Desktop, Word Desktop, and PDF or ePub files.[5] Teachers in our study applied *Learning Tools* in the following types of learning environments:

1. Whole group instruction:

With the Immersive Reader, teachers pushed out the same content to everyone in the class, regardless of reading level, and gave students the option to read on their own or be read to. Teachers reported that *Learning Tools* "leveled the field" for all readers, struggling or not, to access and comprehend complex, grade-level material. Teachers similarly were able to provide whole group instruction in writing, in which students submitted their drafts to the Immersive Reader for editing, and shared their edits for peer review.

Today I wrote an example paragraph and I had words missing, and words that were wrong and sentences that didn't make sense, and so then I had them listen, and had them put a thumb in the air when they heard something that was missing or wrong, and then what would you change? I wanted them to have that experience whole class, where we were doing this together. I also had them have the text in front of them and on the screen and we were listening to it using LT. And they were able to find missing punctuation and missing words and to find words they wanted for replacing.

2. Small group instruction:

The Immersive Reader enabled teachers to assign similar reading materials to small groups. This allowed them to do "jigsaw" lessons, for example, where small groups were responsible for reading and summarizing different chapters of an assignment. *Learning Tools* fostered teachers' ability to differentiate instruction through these small group assignments, and enabled them to partner students who otherwise might not be able to work together given different reading levels.

I was doing a jigsaw where each group was responsible for a chapter. And it seemed that every group had a different way to go about doing it. One group, just one member read aloud. One group, they were reading independently. And the third group…had it being read to them by the [Immersive Reader]. And that seemed really useful in the way that it was a way for me to differentiate my instruction.

[5] Appendix A lists ways in which *Learning Tool*s can be accessed.

3. Independent work at school:

Teachers immediately saw the benefit of using *Learning Tools* for independent work. In the upper grades, teachers encouraged their students to use the software in all their courses. They provided examples for reading and writing, as well as science, social studies and technology. Fourth grade teachers also supported their students in using *Learning Tools* for independent learning and in some cases, found it accelerated their reading and/or writing skills (see Table 2 for examples).

Students made the transition pretty quickly to using Learning Tools on their own. At first I'd say, 'okay, this is our time to practice using Learning Tools.' And then I transitioned to 'If you feel like you'd like to use Learning Tools, this would be a great opportunity.' And now they're at a place where they use it independently. Most of them choose to use the Learning Tools, especially for, like I said, the writing.

4. Independent work at home:

If students have devices with *Learning Tools* that they can bring home, as was the case in this district, they can use the software for homework or to explore content that interests them. One 4th grade teacher encouraged her English Language Learners to practice new vocabulary words at home using *Learning Tools*. Another teacher reported that parents were thrilled to learn about *Learning Tools* and how they could implement it at home to support their child's learning.

I was showing parents of the kids whose reading I was concerned about…showing them 'hey when you're at home, it can help with engagement if your kid is struggling with reading, or if I'm sending home articles for them to read'…I showed them how to plug in Learning Tools, and that this is free… And they were flabbergasted and so excited about it …partnering with parents, and saying 'hey here's another way you can help your child with reading or writing with these particular tools.'

With which group of students does *Learning Tools* work?

There was consensus among all eight teachers that *Learning Tools* is effective for supporting a wide range of students in reading and writing. Based on their interviews, it appears that the Immersive Reader is particularly useful for students in the earlier grades (e.g., 4th grade) as they acquire reading skills, and for struggling readers in the upper grades (middle and high school) for supporting the development of reading mechanics and improving reading comprehension. Additionally, 4th grade teachers found *Learning Tools* to be helpful for all their students in developing writing.

The following illustrates teachers' observations regarding which students seem to benefit from *Learning Tools*.

DEVELOPING WRITERS (4TH GRADE):
General Education students:

I found that with all my General Ed students, when they were typing their papers, if they could actually HEAR it, they were catching lots of mistakes they were making and findings ways to make their papers more stronger… [Grade 4]

DEVELOPING WRITERS (4TH GRADE):
English Language Learners:

For my student who's been speaking English for only 6 months, she seemed more engaged with the task [using Learning Tools for reading]. [Grade 4]

DEVELOPING READERS (4TH GRADE):
All students/At-or-above grade level students:

When I first heard about Learning Tools, I thought they would only be helpful with my struggling readers or my English Learner students. But as I got to know the Learning Tools, I realized they could be helpful for all the students in my classroom…I discovered I could push out articles to my General Ed students that were above their grade level as well. And it was a way to help extend them. [Grade 4]

READING & WRITING:
Special Education students:

I have students who have difficulty in both reading and writing…Once I used the tools, I could see how to train students who have other learning disabilities to use them and I could see how to adapt each individual tool for specific purposes for specific students…I did initial trainings and then followed up … to make sure they were practicing on a weekly basis. Then I alerted parents to the tool so that they could support it at home and help kids troubleshoot it and use it independently. [Grades 11–12]

Teachers also indicated where difficulties arose in using *Learning Tools* with specific groups of students.
A common concern in this district with its population of English Language Learners was how to get the Immersive Reader to read materials in languages other than English. The Reader currently accommodates 30 languages and is continuing to expand. Additionally, the Dictation Tool supports 9 languages, and planning is underway to expand to more.

A concern voiced by teachers in the upper grades was that the Immersive Reader doesn't allow students to annotate. For example, this teacher observed:

In my classroom, students have to be able to annotate while they're reading: they have to take notes, highlight difficult words, etc. This is what they have to be able to do in college. Learning Tools doesn't allow you to annotate while you're in the Immersive Reader. If there was a split screen for the reader and a place to annotate, that would be helpful. [Grades 9–12]

Other teachers got around that issue by having their students annotate in a separate screen as the Immersive Reader was reading to them.

For others, the experience was mixed: *Learning Tools* use is being attributed to this high school teachers' rise in STAR scores with her Special Education students, while simultaneously she acknowledges that is it hard to get them to use new technology:

It is NOT easy to get Special Ed students to use technology. Often times these are students who struggle with technology use, both the appropriateness—i.e. being on task with it, not choosing to do something they shouldn't be doing in class—but also being able to navigate; they really struggle with that. While Learning Tools is really easy to understand…the reality is … it was outside of the norm of how they used their technology and because a lot of them just struggle with being able to remember how to access it…Also the voices…a lot of my students have social-emotional challenges and so…things that a neurotypical person could get over, like 'this voice sounds a little funny,' they couldn't get over that. It was really challenging

for them, so they wouldn't listen to it…The program [Learning Tools] is really useful and all of my STAR scores have gone up since January [since starting to use Learning Tools], but getting them to use it was difficult…The biggest challenges was just to get students to…incorporate it into their general technology usage.

> **Teachers indicated how they planned on using *Learning Tools* in the 2017–18 school year now that they were more familiar with its capabilities and they would have time over the summer to "play around" with the features.**

Two key considerations for decision-makers about whether to adopt educational technology products is cost and ease of use on the part of the district, the teachers and the students.

1.

What does it cost?

Learning Tools is either freely available online in OneNote, Word, or Outlook, free as an add-in with OneNote Desktop, built directly into Word Desktop (as part of Office 365) or Edge Browser (as part of Windows 10). Information about *Learning Tools* and how to access it is available at https://www.onenote.com/learningtools. (See Appendix A for more information).

When asked if they would want to continue using *Learning Tools* beyond the current semester, the 4th grade teachers indicated "definitely!"

2.

How easy is it to use?

Teachers unanimously reported that *Learning Tools* is easy for them and for their students use. Training for most teachers[6] in this study was minimal: they attended a single training after school to learn about the software, watch demos, and to practice. The training took less than a half-hour, which is optimal for school districts, where teacher time is limited.

Learning Tools is easy for districts to adopt because it is built into Office 365 and therefore requires no IT support to launch in schools. Appendix A lists the applications in which *Learning Tools* is either built in or freely accessible online.

In our study, teachers had to learn how to use the Surface computers, OneNote and *Learning Tools* all at the same time. Yet as one 4th grade teacher reported, "learning to use the *Learning Tools* component was the easiest part."

For students, teachers reported that the software wasn't difficult to use; it was more a matter of making the *Learning Tools* part of their learning routines.

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[6] One teacher had one-on-one training with a Microsoft representative earlier in the year due to her interest in the software for use in Special Education classrooms.

CONCLUSIONS

The ways in which the teachers used *Learning Tools* to enhance reading and writing expanded their students' sets of learning strategies, enabling ways of learning that at times exceeded what the teachers could accomplish without the software.

*For my struggling students and my English Language Learners, this is a great way for them to access reading content that was above their reading skills level...they're able to comprehend it if they can hear it, when the text levels are too high. **So this was a way to 'even the playing field.'***

This study was designed to provide timely information to educators about the use of *Learning Tools* for enhancing reading and writing for elementary, middle and high school students. When deciding whether to adopt educational technology products, school, district and state leaders must balance the need for rigorous, scientifically sound research with the need for timely information about how these tools support teaching and learning. This study was designed to provide information in a timely manner to educators about the use of *Learning Tools* for enhancing reading and writing for elementary, middle and high school students. Our study reflected a common education technology adoption, where teachers receive a limited amount of training and are asked to try the product in their classrooms as they see fit, and report back. We interviewed the teachers who agreed to participate, and made use of the district's reading assessment data to gain an initial understanding of whether the product looked promising for supporting learning. The combination of these sources of information indicate overall that *Learning Tools* appears to be a useful digital tool for supporting an array of learning outcomes for elementary, middle and high school students, who range from struggling to above grade-level in their skills. The ways in which the teachers used *Learning Tools* to enhance reading and writing expanded their students' sets of learning strategies, enabling ways of learning that at times exceeded what the teachers could accomplish without the software. Here is what we found:

Learning Tools improves reading comprehension for Elementary, English Language Learner and Special Education students

A key finding in our study is that *Learning Tools* supports reading comprehension especially for developing readers (4th graders), and struggling readers (English Language Learners and students in Special Education). **Reading assessment data for the 4th graders using *Learning Tools* showed an average gain of 123.6 points in their STAR scores, compared to the historical group's 89.2 points, and an average gain of 10 percentile points, while the comparison group dropped by 0.62 points.** Our study design doesn't allow us to claim with certainty that the gains were due to *Learning Tools*; however, teachers' reports suggest that it is plausible. Teachers found the features of the Immersive Reader to support ALL students' reading mechanics and comprehension in the earlier grades as well as for struggling readers in the higher grades.

Learning Tools improves writing

The teachers in our study discovered on their own how the Dictation tool and the Immersive Reader could be combined to support and improve writing skills. The 4th grade teachers intentionally built *Learning Tools* into their capstone writing project and saw immediate improvements in editing and revisions. Hearing their own writing read back to them helped students identify where to change their writing, and motivated them to do so.

Learning Tools provides greater equity through access to learning materials

All the teachers in this study observed that *Learning Tools* "levels the field" for their students. They told of how students who had previously been unable to participate in grade level work—in reading as well as other subject areas—were given access to this work through *Learning Tools*. The Immersive Reader enabled them to participate alongside their peers with content that was beyond their reading skills, by having the content read to them, which facilitated their understanding. Education policy is currently focused on ways in which schools can close opportunity gaps and support equity in education. Learning tools that help students to join their peers in at-or-above grade level learning are of utmost importance. As one of the teachers in this study observed,

For my struggling students and my English Language Learners, this is a great way for them to access reading content that was above their reading skills level… they're able to comprehend it if they can hear it, when the text levels are too high. So this was a way to 'even the playing field.'

Learning Tools supports important learning processes

A key consideration for adopting education technology is whether it supports the ways in which humans learn. [10, 11] *Learning Tools*' features were designed by incorporating research on how people learn to read, including those with reading disabilities. Teachers in our study noted that *Learning Tools* invokes cognitive mechanisms that support how humans learn, in ways not unique to just reading. It's multi-modal approach and the ability to give students choice and control in their learning are key research-supported benefits to learners. Learner-controlled uses of technology reflect a shift from students as recipients of knowledge to active and autonomous participants, which enhances learning. [12] As Daniel Pink describes in his popular book "Drive," autonomy is a key driver of intrinsic motivation. [13] And that includes motivation to learn. Teachers connected control of *Learning Tools* features with increased student motivation in reading and in writing. *Learning Tools* also enables teachers to personalize learning for their students through access to a wider range of materials aligned with their interests and appropriate level of challenge.

Learning Tools supports non-cognitive processes

Educators and policymakers are increasingly concerned with the knowledge, skills and abilities students need to be successful in college and careers. These capabilities go beyond academic skills (e.g., reading, writing, content knowledge) to so-called "non-cognitive" skills such as knowing how to learn and being self-driven. Teachers found that *Learning Tools* helps students to understand how multiple strategies help them learn and teaches them to determine which strategies work best for them. *Learning Tools* facilitated independent and self-driven learning, both of which are critical skills for college and career success.

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Appendix A: Information about *Learning Tools*

TABLE A1. WHERE TO FIND L*EARNING TOOLS*

APP	COST
OneNote Desktop	Free
OneNote Online	Free
Word Desktop	Part of Office 365 Desktop
Word Online	Free
Outlook Online	Part of Office 365
Outlook.com	Free
Office Lens iOS	Free
Edge Browser	Part of Windows 10

For those interested in trying *Learning Tool*s for free, please visit http://www.onenote.com/learningtools

Appendix B: Study Sample

In this study we were not able to randomly assign classrooms to *Learning Tools*. Therefore we had to determine the best comparison group we could obtain without intervening in the district. We were allowed to use historical STAR data from students from the same grade (4th) from the same school, from the 2013/14 through the 2015/16 school years. Table B1 describes the sample sizes from each of the cohorts. The comparison group consists of students from years 2013/14 to 2015/16 (n=223) while the *Learning Tools* group is from year 2016–17 (n=64).

TABLE B1. SAMPLE SIZES FOR THE *LEARNING TOOLS* AND HISTORICAL COMPARISON GROUPS

YEAR	STUDY GROUP	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENTAGE
2013–2014	Historic Comparison	71	24.74	71	24.74
2014–2015	Historic Comparison	75	26.13	146	50.87
2015–2016	Historic Comparison	77	26.83	223	77.70
2016–2017	*Learning Tools*	64	22.30	287	100.00

Not all 223 historical comparison and 64 *Learning Tools* students had both Fall and Spring STAR data for measuring growth. We eliminated those who had only one score using listwise deletion to obtain a final sample of 52 *Learning Tools* and 213 comparison students. A description of those students' is in Table B2 below.

TABLE B2. CHARACTERISTICS OF THE *LEARNING TOOLS* AND COMPARISON STUDENTS

CHARACTERISTICS	*LEARNING TOOLS* STUDENTS (N = 52)	HISTORICAL COMPARISON (N = 213)
White	53%	57.4%
Black	4.7%	2.2%
Asian	20.3%	23.3%
Hispanic	12.5%	8.5%
Multi-racial	7.8%	8.5%
Female	62.5%	54.3%
English Learner designated	12.5%	6.7%
Special Education designated	12.5%	8.5%
Gifted candidate	6.3%	13.5%
S504 designation	7.8%	1.7%
English Language at home	73.4%	75%

Appendix C: How Teacher use *Learning Tools*

Our interviews with teachers also gave us insights into how they thought Learning Tools benefited their teaching. We asked about the types of learning goals they targeted with Learning Tools and the tasks they used to achieve the goals.

READING COMPREHENSION

Teachers described a number of goals related to supporting reading comprehension for their students. Table C1 describes the reading goals and provides examples of how teachers used *Learning Tools* to achieve those goals.

TABLE C1. READING GOALS AND USES OF *LEARNING TOOLS*

READING GOAL	GRADE	HOW TEACHERS USED *LEARNING TOOLS* TO ACHIEVE THAT GOAL (QUOTES FROM TEACHERS)
Reading comprehension	4	In 4th grade, the assumption is that students are fluent readers, but that is not always the case. For some kids decoding and fluency is an issue, and for others, it's comprehension and for others, they're solid in all areas. It's never a bad thing to listen to something being read to you, because you can pull more out of it.
		I was showing parents of the kids whose reading I was concerned about…showing them 'hey when you're at home, it can help with engagement if your kid is struggling with reading, or if I'm sending home articles for them to read'…I showed them how to plug in *Learning Tools*, and that this is free…And they were flabbergasted and so excited about it …partnering with parents, and saying 'hey here's another way you can help your child with reading or writing with these particular tools.'
	6–8	In my reading class, I remind them to use their Immersive Reader to read a passage and answer the questions. I have them listen in the Immersive Reader, take notes, then listen to it again.
From literal to figurative reader	4	In 4th grade students make the transition from being a literal to a figurative reader—that's a big learning goal in 4th grade…hearing the story can actually help them understand a lot of that figurative language …sometimes when they're going thru the process of just the mechanics of reading as well as trying to comprehend it on top of that…The hardest part for them …thinking between the lines: 'oh what's the character's motivation for this? Why did the author decide to do this? What's the author's point of writing this?' And for non-fiction …'Where did the author put the main idea? What is the purpose of this paragraph? What is the most important point I need from that?' Those are the things we work on in 4th grade.
		We do a variety of things; sometimes we teach the skills in isolation…look to the subheadings for what the paragraph is about, or look in the introduction for the main idea, and then we practice…Sometimes as we read aloud to students, we take a moment to pause and talk about that…In 4th grade, we ask students to start picking things out for themselves, so definitely you're seeing the transition from teacher-led to more student-driven lessons, where they're trying to pick out for themselves what's going on.

TABLE C1. READING GOALS AND USES OF *LEARNING TOOLS* CONTINUED

READING GOAL	GRADE	HOW TEACHERS USED *LEARNING TOOLS* TO ACHIEVE THAT GOAL (QUOTES FROM TEACHERS)
"Close reading" and revision (re-reading for comprehension)	4	In reading lessons with *Learning Tools*, I'm trying to teach them to read for what's the main idea, what are the key details, what's the most important information. In having them listen to it, they often catch pieces they miss the first time through reading it on their own. I'm getting them to go back. As adults we frequently re-read for information to make sure we understand it. And this is where they're learning to go back and re-read something. So rather than have them do that second read visually, they're doing it auditorily.
	6–8	Needing to re-read something more than once to understand what they're reading or to pull it apart to see the unspoken part, the inference in a passage and be able to analyze it—my students really struggle with that.
Reading mechanics (e.g., decoding, fluency, rate and pace, vocabulary)	4	A lot of my kids have decoding challenges, breaking apart multisyllabic words and pace of reading, at a pace that is not frustrating and they're not stumbling over words or sounds. The majority are bilingual or from non-English speaking homes, so working through the vocabulary words and the meaning behind words, not recognizing words, not hearing them outside the education environment.
	11–12	Hearing someone else read how it should be read, how it should be pronounced. I think it has a ton of uses and can be very useful.

WRITING

Teachers provided examples of writing goals and the use of *Learning Tools* to achieve them, as shown below.

Our 4th grade is using Learning Tools with a capstone project for Social Studies…We introduced Learning Tools and played around using an article, and showed the features including the reading voice, background colors, etc. We went through and highlighted verbs, nouns and adjectives too. My hope is they'll integrate Learning Tools for their writing, playing back what they wrote to identify missing punctuation, grammar, etc. Then we're going to highlight sentence structure, to see if they have complete sentences…We'll have them share out "oh I found out I was missing a verb" with the whole class, because learning happens better when sharing with the other kids vs. listening to the teacher.

The goal of writing a complete sentence, and then a well-crafted paragraph, and from there, being able to craft an essay that has…transition words, topic sentence, concluding sentence, explaining with details from evidence in a text…If they're listening carefully to what they write, they'll find out if what they're writing makes sense.

We go thru draft, revision, edit, final draft…listening for 'have I explained all my ideas enough, did I say what I intended to say?' When we read it to ourselves, our brains insert what's missing. When someone reads it to us, we hear what wasn't there.

Usually when students are writing something, they get tired of their work. So when they're re-reading it, they don't even notice that they're missing things. Even simple things like punctuation, let alone word choice. And listening back to their writing has really helped make it stronger, which is another grade level goal.

LEARNING PROCESSES

Teachers reported ways in which they used *Learning Tools* to adapt instruction to best meet their students' learning needs.

We were doing a jigsaw where each group was responsible for a specific chapter…one group had the chapter read to them by the Immersive Reader. It was another way to differentiate my instruction. This particular group needed to hear it auditorily, so that's what we did…

This could be a very important resource for the kids I work with. I have students with difficulties in both reading and writing…once I had experienced Learning Tools, I could see how I could train students with other learning disabilities to use them, and I could see how to adapt the tools to work with specific students with specific disabilities…

EQUITY THROUGH ACCESS TO LEARNING MATERIALS FOR ALL

All of the teachers talked about how they used *Learning Tools* to "level the playing field" for their struggling readers.

For my teaching, it's made it really easy to push out reading to students that I know they'll be able to access…if students are unable to read it, they can use the Learning Tools and still be able to do it. I find that the types of articles that I need to choose for students has just expanded versus 'I can only choose from this small window, because that's the level they can read at.'

As a teacher, the benefit of having, it's one more piece that I feel is giving my kids access and taking pressure away from me for coming up with an alternative for that student that might not be able to read the material. So I think there's a huge benefit in that. And the dream is to give all the kids access to the same material…

When asked if they would want to continue using *Learning Tools* beyond the current semester, the 4th grade teachers indicated "definitely!" They were motivated to incorporate *Learning Tools* further into teaching and learning in the upcoming school year. The study provided them with an opportunity to explore the software. As one teacher noted,

I also want to use [Learning Tools] in science class next year. Why don't we set up a science notebook where the kids can be taking their observations and having any articles right in there…they can make their notes right there and read their notes back to themselves using Learning Tools. So I think the implications for this are pretty huge, for how many applications this can be used in and with and for.

The secondary teachers were also excited about continuing to use *Learning Tools*. As one teacher explained,

[Learning Tools] bolsters your resources, it really does…Giving them passages they may not be able to read by themselves but they can listen to and they can learn through is HUGE. And being able to answer higher level questions or create higher level questions—that's the goal.

One teacher whose coursework focuses heavily on annotating while reading—e.g., circle difficult words, highlight important passages, and so on—reported that Learning Tools does not allow readers to annotate in the Immersive Reader. She thought Learning Tools might benefit beginning readers in elementary grades more so than her students.