DIAMOND

DATA INFORMED ACCESSIBILITY: MAKING
OPTIMAL NEEDS-BASED DECISIONS

Student Demonstrations of their Use of Accessibility Features and Accommodations

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Executive Summary

This study presents information about the classroom use of accessibility features and accommodations gathered through in-person interviews with teachers and in-person demonstrations with students. It catalogs the accessibility features and accommodations used in class that were helpful to students, identifies reasons that certain accessibility features and accommodations were and were not used, and explores barriers to the effective use of accessibility features and accommodations.

The 12 English learner (EL), special education, and general education teachers who participated in the in-person interviews shared information about the accessibility features and accommodations used by a particular student or students. Sixteen students then completed demonstrations in which they answered questions, and showed how they used one of their accessibility features or accommodations. The results of the interviews and demonstrations were written up using a qualitative descriptive analysis approach. Five broad themes were identified.

Students. The students who participated in the demonstrations of accessibility features and accommodations either had individualized education programs (IEPs) or were ELs.

Accessibility Features and Accommodations Demonstrations. The students demonstrated a range of accessibility features and accommodations while performing activities from their English language arts, math, science, or social studies classes. Students with IEPs had positive feelings about all of the supports that they demonstrated, which included a highlighter, an iPad, a Visiobook, and Google Read&Write. The ELs similarly believed that the accessibility features and accommodations that they demonstrated, which included a highlighter, a text compactor, and an electronic dictionary, were helpful.

Other Accessibility Features and Accommodations. The student participants with IEPs regularly used a number of accessibility features and accommodations that they did not demonstrate. These included read aloud, extra time, and separate setting. The students with IEPs did not name any accessibility features or accommodations that they had tried that had been unhelpful. The student participants who were ELs regularly used extra time and instructional strategies such as sentence stems and rephrased questions in addition to the accessibility features and accommodations that they demonstrated. Similar to the students with IEPs, the ELs did not report having tried any unhelpful accessibility features and accommodations.

Barriers. The teachers who participated in this study identified several barriers to the effective use of accessibility features and accommodations. They stated that giving proper supports on tests is difficult because tests do not allow some accessibility features and accommodations that are used during instruction. When speaking about technology, the teachers of students with IEPs pointed out that adopting technology-based accessibility features and accommodations often

requires funding from the school administration, and teachers of ELs stated that their students sometimes struggled with the technological supports offered on tests. While teachers of students with IEPs wanted more professional development related to accessibility features and accommodations, professional development did not come up during interviews with teachers of ELs.

Conclusions and Implications. In order for students to receive the full benefits of accessibility features and accommodations, education systems must achieve the following goals:

- Allocate funds for technology-based supports

- Implement professional development for teachers and staff

- Build teachers' willingness to implement supports

- Build teachers' willingness to seek alternative or additional supports for students

- Encourage teachers and specialists to collaborate to select and implement supports

- Seek out external specialists' recommendations and resources

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Introduction

In recent years, a paradigm shift has occurred in the way that educators, researchers, and policymakers think about accessibility (Larson, Thurlow, Lazarus, & Liu, 2019). Although states previously offered accommodations only to students with disabilities and English learners (ELs), they now use a tiered accessibility system that includes all students. Students who do not have disabilities and who are not ELs are now eligible to use accessibility features on assessments and during instruction.

Although the new accessibility framework has the potential to address all students' unique needs and characteristics, it also requires educators to make more decisions about accessibility features and accommodations. These decisions often are being made without established protocols in place.

In 2015, the United States Department of Education awarded an Enhanced Assessment Initiative grant to the Data Informed Accessibility – Making Optimal Needs-based Decisions (DIAMOND) project to create professional development resources for educators who have to make these decisions about accessibility features and accommodations. DIAMOND project staff conducted several research activities to examine the challenges that educators face, including a white paper (Shyyan, Thurlow, Larson, Christensen, & Lazarus, 2016), an online survey (Thurlow, Larson, Lazarus, Shyyan, & Christensen, 2017), online focus groups (Goldstone, Thurlow, Liu, & Lazarus, 2018), and phone interviews (Albus, Thurlow, Larson, Liu, & Lazarus, 2019; Albus, Thurlow, Liu, Lazarus, & Larson, 2018).

In the final DIAMOND research activity, staff interviewed educators and their students in person. The goal of conducting these interviews in schools was to better understand how decisions about accessibility features and accommodations are made, how they aid students' learning, and how students react to them. In particular, the study sought to answer the following research questions:

1. What accessibility features and accommodations do students use that help them in class?

2. What are the reasons teachers and students give for accessibility features and accommodations that are used or not used in class?

3. What barriers do students and teachers face in using accessibility features and accommodations?

Methods

Study Recruitment

Educators who participated in the in-person interviews were recruited through phone interviews that the DIAMOND project conducted in 2017 and 2018 (Albus et al., 2018). In the phone interviews, educators were asked a series of questions about the accessibility features and accommodations that they used with students during instruction and classroom assessments. The last question asked interviewees whether they would be willing to have researchers visit their schools to talk with them and one or two students about their use of accessibility features and accommodations.

DIAMOND staff considered several factors when selecting candidates for the in-person interviews. First, staff made sure that the candidates actually used accessibility features that were listed in their states' accessibility manuals. The accessibility features and accommodations also needed to be observable in a one-on-one observation with a student, which ruled out supports such as "repeat directions as needed," "extended time," or "separate setting."

The teachers also needed to work in public or charter schools. Although most of the participants in the phone interviews were from these kinds of schools, there were some from nonpublic schools that focused on certain populations of students with disabilities. Because participating students would need to provide assent, DIAMOND staff also excluded teachers who exclusively taught students with significant cognitive disabilities.

DIAMOND staff considered aspects of the educators' work profiles, such as the grade levels that they taught, to ensure that the in-person interview participants would be a diverse group. The teachers' location within states also became important as DIAMOND staff determined which schools could be visited by car or plane.

Because it often took a considerable amount of time to decide which educators to follow up with, a number of candidates ended up no longer being able to participate. The phone interviews generally occurred in the late winter of 2017 and 2018, so teachers often were wary of scheduling in-person interviews when they were approaching testing season.

In initial e-mail communication with educators about potentially visiting their schools, DIAMOND staff mentioned several accessibility features or accommodations that the educators had talked about in the phone interviews. They asked the educators whether they currently had any students who used those accessibility features and accommodations, whether the students would be able to demonstrate them on their own, and whether the students would be able to answer questions about them.

If educators responded affirmatively, they were then asked to complete a permission form for themselves (see Appendix A). They were also sent a parent consent form (if the selected student was under 18) or a student consent form (if the selected student was 18 or over) along with instructions about how to obtain consent (see Appendices B, C, and D). They were asked to return all signed documents by e-mail, and to list dates and times that might work for an in-person interview.

In total, DIAMOND project staff interviewed 12 teachers at nine schools across four states (see Table 1). Six of the participants were special educators, three were EL educators, two were general educators, and one was both a general and EL educator. Five worked in elementary schools, two in middle schools, and five in high schools.

Table 1. Educator Participants

State	School	Role	Gender	Notes
Alabama	1	Teacher	Female	Special education teacher, middle school
	2	Teacher	Male	General education teacher, high school
	2	Teacher	Female	Special education teacher, high school
	3	Teacher	Female	Special education teacher, elementary school
	3	Teacher	Female	General education teacher, elementary school
	4	Teacher	Female	Special education teacher, elementary school
Michigan	1	Teacher	Female	EL coordinator, high school
Minnesota	1	Teacher	Female	Special education teacher, high school
	1	Teacher	Male	Special education teacher, high school
	2	Teacher	Female	General education and EL teacher, elementary school
Ohio	1	Teacher	Female	EL teacher, elementary school
	2	Teacher	Female	EL teacher, middle school

The in-person interviews also included 16 students who were similarly spread across nine schools in four states (see Table 2). Nine of the students who participated were ELs: three were in elementary school, two were in middle school, and four were in high school. The other seven students had an Individualized Education Program (IEP): four were in elementary school, two were in middle school, and two were in high school.

Table 2. Student Participants

State	School	Role	Gender	Notes
Alabama	1	Student	Female	6th grade, has an IEP
	1	Student	Male	6th grade, has an IEP
	2	Student	Male	12th grade, has an IEP
	3	Student	Female	4th grade, has an IEP
	3	Student	Male	2nd grade, is an EL
	4	Student	Male	5th grade, has an IEP
Michigan	1	Student	Male	11th grade, is an EL
	1	Student	Male	10th grade, is an EL
	1	Student	Female	10th grade, is an EL
	1	Student	Female	9th grade, is an EL
Minnesota	1	Student	Male	9th grade, has an IEP
	2	Student	Male	6th grade, has an IEP
Ohio	1	Student	Female	4th grade, is an EL
	1	Student	Female	4th grade, is an EL
	2	Student	Female	8th grade, is an EL
	2	Student	Male	8th grade, is an EL

Data Collection Procedures

When DIAMOND staff arrived at schools to conduct in-person interviews, they typically met with the educators first. The educators gave some basic demographic information about the selected students and described the students' use of accessibility features and accommodations. The interview questions covered the contexts in which the students used the accessibility features or accommodations, how the accessibility features and accommodations were selected, and how the student had responded to the accessibility features and accommodations (see Appendix E for the full list of questions).

The DIAMOND staff member then interviewed the students after obtaining their assent (see Appendix F). The students were asked for their perspective on how their accessibility features and accommodations aided their learning, what they liked about their accessibility features and accommodations, and whether other accessibility features and accommodations might be helpful to them (see Appendix E for the full list of questions).

The students then gave brief demonstrations of their accessibility features and accommodations using a task that the educators had provided. For example, one student participant read a text while using a highlighter, and another student participant worked on a slideshow while using the text-to-speech and word-prediction tools in Google Read and Write.

Educators who completed in-person interviews received a $50 gift card for their participation. Students received a $25 gift card.

Data Preparation

DIAMOND staff took notes on paper during the teacher and student interviews. Soon after conducting the interviews, they fleshed out the notes on their computers.

Data Analysis

A qualitative descriptive (Miles, Huberman, & Saldaña, 2013) approach was used in the analysis of teachers' and students' responses to open-ended interview questions. Data from their responses were first grouped separately by each question for both teachers and students. Building on the first level of analysis, a second level of analysis was completed by grouping results for teachers of students with IEPs and for teachers of ELs. Analyses also looked across these two groups for commonalities. A team of researchers reviewed the data and analysis results to discuss any discrepancies.

Results

Results of the qualitative analyses presented here are organized into sections about: (a) students, (b) accessibility features and accommodations demonstrations, (c) other accessibility features and accommodations, (d) teachers' and students' views on barriers to technology use and professional development, and (e) conclusion and implications. Results in each section are separated between those for students with IEPs and those for ELs.

Student Group Results

Students with IEPs

Teachers generally described the students with IEPs in this study as individuals who were hard workers, self-advocates for their needs, independent, and responsible. One student was in the gifted program, and other students performed at grade level in some content areas and spent most of their time in their general education classes. Still, each student had different needs and supports that were used to access content in the class.

English Learners

Teachers described ELs overall as above-average and model students. If they were inhibited to ask questions in class, they needed a little encouragement to do so. A teacher observed that an elementary EL seemed to have displayed a longer "silent period" in her language development process. This student's development then shifted to reading aloud to herself in the classroom when encountering new texts. Students who were ELs also commonly used graphic organizers to help keep track of their work.

Accessibility Features and Accommodations Demonstrations

All students in this study demonstrated their dedicated use of accessibility features and accommodations. These supports varied from relatively simple tools to more involved use of technology-based programs. Students showed their use of these supports in a range of content activities including reading and writing in English language arts, math, science, and social studies.

Students with IEPs

For some students with IEPs, certain accessibility features and accommodations were relatively common and available (see Appendix G). For example, some students used a highlighter to help mark where to find answers to questions in a reading passage. This tool helped one student who also received extra or extended time so as not to rush to complete tasks. She had only started having these supports in her current grade, and she said it was not hard to use them. Before getting these supports, she received bad grades and got in trouble for rushing through her work. The student believed that these supports helped her get better grades.

A 12th-grade student received supports because he had difficulty with memory and finding information. In a reading task, he showed how he first read questions and then used a highlighter to identify the information in the text that answered the questions. He had used highlighting since ninth grade. This student also demonstrated tracking words with a pencil while reading, which helped him keep his place. He had used pencil tracking since the fifth grade, which his general education teacher introduced to him. Also, he used underlining in science and math story problems. Extra time also had been provided to him since his early elementary years. He stated that the supports helped him know the meaning of text he read and answer questions. He had not used other types of technology to help him with his reading and writing difficulties, but he started to move from writing by hand to typing on a computer.

For other students with IEPs, the use of accessibility features and accommodations involved more complex technology-based software programs with electronic devices (see Appendix G). In one example, a student used Visiobook to read his iPad, take tests, and connect to the

teacher's laptop. He had been using the Visiobook for the past six years. This type of support was selected in pre-K services with consultation from the state Institute for the Deaf and Blind. He recalled that he helped choose it, and he found it was easy to learn to use. The Visiobook helped him see everything and made everything readable. There was nothing he disliked about it. He used it almost all the time except for during some science projects and group work. The student loved his Visiobook, and peers wrangled to be the ones to help him carry the case to his next class. He also began using closed caption television (CCTV) at the age of three.

Another student with an IEP also used an iPad for visual purposes, but with different software programs. Because he had been using an iPad in class since third grade, he was very used to it as a high school student. He initially got an iPad when the vision specialist recommended it. The student has had the same vision specialist since pre-kindergarten. This vision specialist was part of a co-op that served approximately six schools. The vision specialist had the primary role of selecting accommodations and training other educators on how to use them. The vision specialist and case manager had been working with the student to become a better self-advocate. The IEP team included the vision specialist, case manager, special education supervisor, general education teachers, school social worker, and the student's mother. The mother of the student was very involved in the vision-impaired community and kept abreast of new technologies that could help her son.

The teachers observed that something needed to change for this student because he was leaning forward and squinting to see the words on the board. Though he could read typical-sized texts, doing so led to eye fatigue. He used an iPad when the teacher lectured or wrote on the board and when students were expected to work from their textbooks or to complete worksheets. The iPad allowed him to have a closer view of content on the projector, to read textbooks, and to enlarge worksheets. Some of his classrooms had installed curtains because glare could make it harder for him to see. He demonstrated a few of the different software programs he used on his iPad.

One software program the student demonstrated was Join Me, which allowed him to see what teachers projected on the SmartBoard. He demonstrated a math lesson in Join Me that showed the content that appeared on the SmartBoard on his iPad. Another program he demonstrated was Read2Go/Bookshare, which allowed him to change the font size and colors of electronic versions of his textbooks. He also used this program to read his science and math textbooks and novels in English.

Goodnotes was another program that allowed him to take pictures of worksheets and draw, write, or type directly on those images on his iPad and then turn in the completed worksheet electronically. He used all of these programs in class whenever he had a reading or when a teacher used the SmartBoard. Although the student most often used these tools to access information, he sometimes used them to produce his work. For instance, when the teacher allowed a

class to look up answers for worksheets, the student found it easy to move between Goodnotes and online search results. However, Goodnotes was a bit harder to use than the other programs because its tools could be challenging to find. Overall, he thought that it was much easier to learn when he could see and read.

His teachers thought there were other students in the school, such as those who struggled with writing, who could benefit from using an iPad, but the teachers thought these students would feel self-conscious being one of the only students in the class using a device. The device policy depended on the teacher. Some allowed students to use devices as part of class activities; others made their students put their phones in a bucket or bin when they walked into the classroom.

Another student who was a slow reader had been using Google Read&Write for a few months for both reading and writing. He thought that most of the icons in the toolbar were easy to use and learn quickly, but some were unclear. He demonstrated how to use Google Read&Write for a social studies project. The program helped with both reading and writing in academic projects. For a recent science project, the program allowed him to highlight passages that the computer then read aloud. He used headphones when he did this in class so as to not disturb the class. Then, the student was able to copy text into a Google Doc to paraphrase it with the help of the Google Read&Write word predictor. Because he was a slow writer and typist, after typing one or two characters, the program suggested words that he could select with the cursor. His writing teacher also allowed him to use a dictation feature where he could speak into the computer's microphone, and the program would do its best to write out the words. Most tools could be used with the entire Google Suite. However, it was the student's responsibility to ask his teachers if he could use Google Read&Write for specific tasks.

His teacher stated that he had done well with Google Read&Write. Before having access to it, he would avoid tasks. He now participated more and had more independence. The teacher explained that the speech teacher in the school wanted to use Google Read&Write with certain students. Although all students were taught how to use Google Read&Write, it was not empha-sized for general education students to use. It had cost $100 per student or $1000 per district. The speech teacher then worked with all of the classroom teachers to introduce the tool to them, which normalized its use. Still, the number of options within Google Read&Write could be overwhelming for some students.

English Learners

Similar to students with IEPs, ELs indicated that their supports helped them to do classwork. The supports they used enabled them to learn to communicate, read, spell, write in English, and review and edit papers (see Appendix H). For example, an elementary EL reported that he knew

very little English when he first started school in the U.S. and that he could not communicate with the teacher.

Some ELs demonstrated their use of a highlighter. It was typical for ELs to use a highlighter in reading and writing class activities, such as when comparing and contrasting information in a text. One student stated that she first used the highlighter the previous year, when her third-grade teacher introduced it for reading. She liked using a highlighter and circled or underlined essential points because it was easy to do. Highlighting saved her time because she did not have to re-read an entire text segment when writing answers to questions in the graphic organizer. Another student recalled learning to use highlighters while reading when she was in kindergarten or first grade. A teacher stated that students in general and her ELs in this study had been given the opportunity to use highlighters during reading activities before attending her sheltered English instruction classroom in the current school year. The teacher estimated that this student was likely first taught to use highlighters by a different teacher during second or third grade.

In contrast to ELs in the elementary grades, ELs in the upper grades from middle to high school levels were less hesitant to ask questions about things that they did not understand. They reported using computer devices, software programs, and a variety of dictionaries more than elementary ELs (see Appendix H). They used different software programs such as Google Translate, the Google Suite (e.g., organizer, timetable, calendar, slideshows), text compactor to simplify long reading passages, electronic dictionaries (e.g., Learners, Thesaurus.com), glossaries for math, and Quizlet to study vocabulary for tests. They found these easy to use, even though many students were only in their first year in the U.S. They found that these tools helped them to learn the meanings of English vocabulary and to read and write in English their class assignments and projects.

The extent to which ELs used the translation tools varied in their different content classes. For example, one EL explained he used Google Translate when words such as "synonyms," "verbs," and "nouns" were hard to find. Another student stated he thinks first in his home language and then uses Google Translate to translate into English. Even though Google Translate was faster to use than a dictionary, a barrier was that some words in his culture did not exist in English and vice versa. Another student stated that, because she did not speak English well, some of the tools she used were better for improving her English speaking than her English reading skills. For another student, looking things up on some Google tools was sometimes tricky because it was all in English. Also, it was necessary to learn how to use a calculator to solve math problems, which took time.

Other Accessibility Features and Accommodations

Students with IEPs

Teachers and students with IEPs mentioned some other supports they used that the students did not demonstrate (see Appendix G). For example, one student who read very slowly received read aloud support in the general education class. The special education teacher read aloud to the student for an additional class period and provided support in content areas such as in learning vocabulary. Also, because this student was easily distracted, he was provided extra time and a separate setting to finish classroom tasks. In another example, moving helped a student learn. He sometimes used a T-stool (a stool that requires balance and coordination to sit), chewed gum, or placed a Theraband (a large elastic band) across the legs of his desk so that he could bounce his legs.

In general, there were no other types of accessibility features and accommodations students with IEPs tried that were unhelpful. One student emphasized that he had added supports over time and could not recall trying something that he did not then use consistently. Another student seemed only to be aware of what she was provided. Students who needed vision support stated they had tried other things, including a magnifying glass or other programs for computers and tablets. For one student, a program that he tried magnified too much, and there was no option to magnify less. Also, before he started using the iPad in elementary school, the student would ask teachers to blow up the material on the projector or to print worksheets in a larger size. The student was sure that there were other programs for his iPad that would be useful, but he did not know what they were.

English Learners

In addition to using highlighters, it was common for teachers of ELs to give extra or extended time to ELs to complete their work and during state tests (see Appendix H). ELs did not identify other supports they wanted to try, or they stated that they did not know what other options were available, if any. One upper-grade student independently read more stories. A few upper-grade students said they enjoyed watching animation videos with English subtitles. Another student learned to type using online tools (typing.com).

One EL teacher demonstrated the following teaching strategies she typically used during class activities:

- Prompting student responses with sentence stems

- Rephrasing directions and asked questions to check student comprehension

- Illustrating with a Whiteboard to model; preview, identify and define vocabulary; list student responses; underline and circle important points and words (e.g., title, topic sentences); show video clips

- Providing examples of word definitions to pre-teach student tasks

- Coordinating student pair share

- Directing students in individual and group/class work

- Directing students to conduct online searches to respond to questions

- Directing students to handwrite responses in their hardback paper journals

Barriers to Technology Use, Resources, and Professional Development

Teachers for both students with IEPs and ELs described supports that were not always readily available or not allowed on state tests compared to what students used in classwork.

Technology Accessibility Features and Accommodations

Students with IEPs

Some school districts were in the process of transitioning to different tests or different software programs that did not always allow for the same accessibility features and accommodations as previously used (see Appendix G). Some teachers expressed that their students with IEPs received the same supports for both classwork and tests, or that whatever was provided on state tests must also be done in the classroom. For example, the student who used an iPad in class could use it during testing. However, for other students, read aloud was not always allowed on state tests. In one instance, if read-aloud required a teacher to administer the test to provide this support, it was more likely to be skipped and the student would have to guess at answers to questions. Online tests allowed one student to use zoom and to switch the display colors (he preferred white text on a black background). If the zoom was not enough, he physically moved the computer so that it was closer to him. In general, some teachers thought that there was too much attention paid to the tests, which only give a narrow snapshot view of students. Moreover, it was hard to individualize for a student when similar things were used for everyone and would not capture what students actually knew.

English Learners

Teachers of ELs stated there were generally fewer supports that students were allowed to use in state tests than in the classroom (see Appendix H). For example, with state testing, a small group of supports might be permitted, but oral administration, extra time, clarification of direc-

tions, and restatement of questions might not be allowed. Also, unlike paper-pencil tests, online tests did not offer ELs specific supports such as highlighting, reading aloud to self, and using a pencil tip to follow along with reading.

Some of these differences in accessibility features and accommodations between classroom and state tests were reflected in teachers' responses about how their school district or state department of education could better support them and their ELs. On the one hand, some teachers thought things were good as they were and that their professional development was relevant. On the other hand, other EL teachers wanted an increase in the use and types of accommodations and other resources, including:

- Allowing clarifying and rephrasing directions
- Allowing a glossary for directions and reading
- Compiling a comprehensive list of accommodations from other sources that others are using
- Providing information about the state tests to parents
- Allowing a test waiver for a second year, especially for new arrivals, on reading tests
- Allowing paper tests, especially for new arrivals who have no experience with computers
- Allowing the test administrator to rephrase questions
- Allowing Google Translate or something comparable to use on state and district tests
- Expanding a translation system with an increase in the resources to enhance students' comprehension beyond what Google Translate can do

An EL teacher explained that, when taking paper-pencil state reading tests in previous school years, students had used their pencils to underline essential words, but now with taking tests online, students in general—and EL students in particular—were not allowed to use highlighters or pencils to emphasize essential words. Another teacher thought a math glossary aligned to state standards embedded in tests would be ideal. An EL teacher also thought state testing should continue to be untimed, noting that ELs should not feel stressed by time limits. This teacher commented that one of her ELs in a previous school year, who has since been exited from the EL program, had expressed substantial stress in a recent state test session because she no longer had access to extra time as a support. The teacher expressed the concern that exited ELs ought not to lose their opportunity to have extra time during state assessments.

Technology Resources

Students with IEPs

Though teachers and students with IEPs described how technology devices and software programs helped students participate in class work, they also explained associated implementation challenges and issues. As an example, one of the students used Google Read&Write on a computer:

- Teachers had to persuade the district to pay for Google Read&Write.

- The speech teacher in the school spearheaded the campaign for Google Read&Write. This teacher recommended this program for several students and worked with other teachers to introduce the tool to them.

- The sharing between teachers and staff on how this accessibility feature was working in their classrooms allowed for effective collaboration to support the student.

- The student found Google Read&Write very useful overall. He wished that he could use it at home, but he only had access on his school computer.

- Google Read&Write was written in the student's IEP. He would be able to use it throughout middle school, but it was less certain what would happen in high school.

- Google Read&Write was not allowed on state assessments. State tests allowed for math and science sections to be read aloud to students and for students to get help writing responses, either from assistive technology or from a scribe. However, this student did not receive these supports on state tests.

English Learners

Though some ELs self-determined which supports they preferred and when to use them, the provision of a few of these tools depended on district decisions. For example, one district was in transition to becoming a Google district and the use of a dictionary was in the approval process for students to use on state tests, though further details were not yet available. Also, it was not uncommon for general education teachers to collaborate with an EL teacher to make decisions on accessibility features and accommodations for students to use in the class. For instance, they used their state's English language proficiency standard levels and students' language ability to guide their suggestions and decisions. A specific concern that one EL teacher expressed was that students in general, including ELs, had difficulties flipping pages front to back and scrolling on electronic devices during state testing. This made it difficult for students to attend to the text continuously when some of the text was no longer visible.

Students with IEPs

Some teachers believed that they were well supported and that the school provided what students with IEPs needed through external resources, such as a vision specialist. Other teachers thought they could benefit if their school, district, or state department of education could support them with professional development time on how to make accessibility and accommodations decisions for students. They thought it would be helpful to:

• Practice using the different accessibility features and accommodations

• See students use the applications, for example, in embedded videos or screencasts

• Understand how the supports helped students reach academic standards

• Show how the supports could be used in each content area

• Show how the supports could benefit all students, not just those with disabilities or difficulties

English Learners

The topic of professional development did not arise with any of the EL teachers. However, one EL teacher stated that it was critical for general education teachers in particular to be knowledgeable about accessibility features and accommodations, and know how to implement them for ELs in content classes.

Conclusion and Implications

The students in this study stated that the accessibility features and accommodations that they demonstrated, as well additional ones they and the teachers mentioned, were helpful to them. Technology platforms and devices especially played a significant role, particularly when students had more complex needs and when supports were not available in paper formats. These supports gave students access to academic content that allowed them to participate in class, and to become relatively independent and responsible for their learning and work. Some of the tools could also save time for teachers who did not have to prepare special materials or the need to provide one-to-one attention to students. However, for students to receive these benefits, they were dependent on:

• administrative decisions to allocate funds for technology-based supports,

• professional development time for teachers and staff to learn how to implement these supports,

- teachers' willingness to implement accessibility features and accommodations,

- educators' willingness to seek alternative or additional supports for students,

- teachers and specialists' willingness to collaborate to share information to make decisions and to coordinate implementation, and

- external specialists' provisions of recommendations, support, and resources.

The students included in this study had different needs that required different individualized considerations and supports. For some students, their needs and supports shifted as they advanced grades. The period of time when they used supports also differed. Some had used supports for several years, while others only recently had started using supports. Many of the students stated they had not tried other things that were unhelpful, or they stated that they were not aware what other supports or technology programs could be used. With the continuing changes in technology supports for use in the period of time when they used, this study indicates that it is necessary for all educators to become informed of what accessibility features and accommodations are available. They also must identify meaningful supports and make appropriate decisions about accessibility features and accommodations that meet the needs of their students, including students with IEPs and ELs.

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Appendix A

Teacher Consent Form

Overview of Study

Thank you for your interest in this study that explores the accessibility features and accommodations that students use in the classroom and on assessments. This research study is part of the larger Data Informed Accessibility - Making Optimal Needs-based Decisions (DIAMOND) project. The DIAMOND project is grant project awarded to a group of nine states (AL, CT, MD, MI, MN, OH, WI, WV, VI) along with the National Center on Educational Outcomes.

You were identified for possible participation in this study because you completed a phone interview for the DIAMOND project during which you expressed interest in completing an in-person interview about a particular student's use of accessibility features and accommodations. Please read the information in this form and ask any questions you may have before agreeing to be in the study with one or more of your students (for whom consent will be sought from parents/guardians of minor students or from adult students). If you have any questions that you would prefer to discuss with someone other than the researcher, please call the University of Minnesota Research Subjects Advocate Line at 612-625-1650.

Purpose of Study

This study is being conducted by researchers from the National Center on Educational Outcomes at the University of Minnesota. The results of this study will help policymakers better understand how teachers make accessibility and accommodations decisions for students, as well as providing information about what students use and what preferences they have. The data that are collected will help state departments of education train teachers on choosing appropriate accessibility features and accommodations for students, and may improve student test scores as a result.

Procedures

Participating in this study involves five steps. First, we will ask you to review this consent form, ask questions, and sign it if you agree to participate in the study.

Second, you will participate in a brief training exercise (via webinar) on how to talk with parents and adult students about the study and obtain their agreement to participate. Obtaining consent from parents and adult students must follow federal requirements to ensure that their consent is given voluntarily.

Third, you will obtain consent from the parents/guardians of minor students (under age 18) in the activity using a consent form that we provide to you, and following specific procedures to ensure that the consent is voluntary. You will send a scanned copy of the consent form to Martha Thurlow at DIAMOND@umn.edu.

Fourth, you will obtain consent from any adult students (ages 18-21) in the activity using a consent form that we provide to you, and following specific procedures to ensure that the consent is voluntary. You will send a scanned copy of the consent form to Martha Thurlow at DIAMOND@umn.edu.

Fifth, after submitting these forms to the researchers, you will be asked to participate in a 30-minute in-person interview with the researchers. The purpose of the interview is to provide information on current practices in choosing and assigning accessibility features and accommodations in the classroom, as well as any barriers to selecting and implementing these options. The interview may be recorded so that researchers can listen to the conversation again while analyzing the information. We will ask you for your permission to turn on the tape recorder during the interview.

Risks and Benefits of Being in the Study

There is no foreseeable risk associated with your participation in this research.

There is no direct benefit to you or your students for participation in the study. Your interview responses from study will be used to improve accessibility and accommodations policies and procedures on state assessments.

Compensation

We will provide a $50 gift card to you after completing the interview.

Confidentiality

The records of this study will be kept private. In any report that we might publish, we will not include any information that will make it possible to identify you or your student. Research records will be stored securely and only researchers will have access to them. This study will end in September 2018.

Voluntary Nature of the Study

Participation in this study is voluntary. Your decision about participation will not affect your current or future relations with the University of Minnesota, or your state, school district, or school. If you agree to participate, you may withdraw at any time without affecting those relationships.

Contacts and Questions

The researcher conducting this study is Martha Thurlow. You may ask her questions by calling (612-624-4826) or e-mailing (THURL001@umn.edu). If you have questions later, **you are encouraged** to contact her. Dr. Thurlow is located at the National Center on Educational Outcomes at the University of Minnesota in Minneapolis, Minnesota.

If you have any questions or concerns about this study and would like to talk to someone other than the researchers, **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware Street, SE, Minneapolis, MN 55455 (612-625-1650).

Statement of Consent:

Your signature below indicates that you have read this form, had an opportunity to ask any questions about your participation in this research, and voluntarily consent to participate.

Name (please print): _____

Signature: _____ **Date:** _____

Appendix B

Parent Consent Form

Invitation to be in a Research Study

Researchers at the University of Minnesota invite your child to be in a research study. We want to learn about classroom supports students use to help them learn and take tests. A few examples of common supports include making print larger, having math problems read aloud, or changing the colors on a computer screen so words are easier to read. There may be many other kinds of supports. We want to hear from students and teachers about what supports work and do not work. We want to figure out how to help all students learn better and show what they know.

Please read the information on this paper. At the end of the second page you may agree to have your child be in the study. If you have questions, please call the study director, Martha Thurlow, at 612-624-4826. You can also call the University of Minnesota Research Subjects Advocate Line at 612-625-1650.

Steps in the Research Study

First, you will tell us if you agree for your child to be in the study. Your child will also have a choice to be in the study. Students who want to be in the study will meet with a researcher for about 30 minutes one day at school. They will answer some questions about the learning supports that they use in class and on tests. They will show the researchers how they use these learning supports. At that time, students can share opinions about how much the learning supports help them. Your child's teacher will complete an interview at a different time. Teachers will talk about how they choose learning supports to help students.

Risks and Benefits

This study will not harm your child. Your child may miss a little class time to talk with the researchers. We will work with your child and the teacher to choose the best time for the interview.

There are no benefits for participating in the study. Your child's interview answers will be used to make decisions about the kinds of learning supports to have in the future. The answers may also help teachers understand how to choose the best supports.

Payment

Your child will receive a $25 gift card for completing an interview. Your child's teacher will receive a $50 gift card for completing a separate interview.

Privacy

The information we collect about your child will be private. When we write about the interviews we will not include information that will identify your child. We will only write about what the large group of students told us. Information we collect about your child will be kept in a protected place. Only researchers will be able to see the information. This study will end in September, 2018.

Volunteering for the Study

You and your child decide about being in the study. Your decision will not change your relationship with the teacher, the school, the school district, or the University of Minnesota. If you and your child agree to be in the study, your child may leave the study at any time without changing those relationships.

Contacts and Questions

The person responsible for this study is Martha Thurlow. You may contact her by telephone or e-mail at any time:

Dr. Martha Thurlow
National Center on Educational Outcomes
University of Minnesota
Minneapolis, Minnesota
612-624-4826
THURL001@umn.edu

If you have any questions or concerns about this study you may also contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware Street, SE, Minneapolis, MN 55455 (612-625-1650).

Agreement to be in the Study:

Signing your name on the line below shows three things: (a) you have read this form; (b) you had a chance to ask questions about the research study; and (c) you agree for your child to be in the study.

Your child's name (please print): _____

Your name (please print): _____

Signature: _____ **Date:** _____

Appendix C —————————————————

Student Consent Form

Invitation to be in a Research Study

Researchers at the University of Minnesota invite you to be in a research study. We want to learn about classroom supports students use to help them learn and take tests. A few examples of common supports include making print larger, having math problems read aloud, or changing the colors on a computer screen so words are easier to read. There may be many other kinds of supports. We want to hear from students and teachers about what supports work and do not work. We want to figure out how to help all students learn better and show what they know.

Please read the information on this paper. At the end of the second page you may agree to be in the study. If you have questions, please call the study director, Martha Thurlow, at 612-624-4826. You can also call the University of Minnesota Research Subjects Advocate Line at 612-625-1650.

Steps in the Research Study

First, you will tell us if you agree to be in the study. Students who want to be in the study will meet with a researcher for about 30 minutes one day at school. They will answer some questions about the learning supports that they use in class and on tests. They will show the researchers how they use these learning supports. At that time, students can share opinions about how much the learning supports help them. Your teacher will complete an interview at a different time. Teachers will talk about how they choose learning supports to help students.

Risks and Benefits

This study will not harm you. You may miss a little class time to talk with the researchers. We will work with you and your teacher to choose the best time for the interview.

There are no benefits for participating in the study. Your interview answers will be used to make decisions about the kinds of learning supports to have in the future. The answers may also help teachers understand how to choose the best supports.

Payment

You will receive a $25 gift card for completing an interview. Your teacher will receive a $50 gift card for completing a separate interview.

Privacy

The information we collect about you will be private. When we write about the interviews we will not include information that will identify you. We will only write about what the large group of students told us. Information we collect about you will be kept in a protected place. Only researchers will be able to see the information. This study will end in September, 2018.

Volunteering for the Study

You decide about being in the study. Your decision will not change your relationship with your teacher, your school, your school district, or the University of Minnesota. If you agree to be in the study, you may leave the study at any time without changing those relationships.

Contacts and Questions

The person responsible for this study is Martha Thurlow. You may contact her by telephone or e-mail at any time:

Dr. Martha Thurlow
National Center on Educational Outcomes
University of Minnesota
Minneapolis, Minnesota
612-624-4826
THURL001@umn.edu

If you have any questions or concerns about this study you may also contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware Street, SE, Minneapolis, MN 55455 (612-625-1650).

Agreement to be in the Study:

Signing your name on the line below shows three things: (a) you have read this form; (b) you had a chance to ask questions about the research study; and (c) you agree to be in the study.

Your name (please print): _____

Signature: _____   **Date:** _____

Appendix D

Consent Instructions

Obtaining consent for participants in the student interviews and demonstrations must follow federal requirements to ensure that consent is given voluntarily. To ensure that this occurs, we ask that you follow these procedures:

- If the student is 18 or over, he or she does not need parental consent. Give the Adult Student Consent letter to the student without commenting on the study. If the student asks questions, please refer him or her to the study director, Martha Thurlow (612-624-4824, thurl001@ umn.edu).

- If the student is under 18, give the Parent Consent letter to the parents of the student without commenting on the study. You can use either the English version or the Spanish version of the Parent Consent letter. If parents ask questions, please refer them to the study director, Martha Thurlow (612-624-4824, thurl001@umn.edu).

- When you receive the signed consent form, please scan and e-mail it to us or take a photo that clearly shows the signature on the form and e-mail that.

- If the student is under 18, the researchers will obtain assent from him or her on the day of the interview and demonstration. When you talk with the student, you should use the language we will use when we ask the student for his/her assent to participate (see below):

  o If you agree to be in this study, the researchers will ask you to talk with us for about 30 minutes. They will ask you to show us some school work you have done using an accommodation or another kind of learning support. They will ask you to show them how to use this learning support. You will have a chance to give your opinions about using these things. It is okay to tell them exactly what you think. They will be sure to keep your answers private. No one else will know what you said. If you complete the interview, you will receive a $25 gift card.

Being in this study is totally up to you, and no one will be mad at you if you do not want to do it. You can ask any questions that you have about this study. If you have a question later that you didn't think of now, you can ask your teacher.

Appendix E

Interview Protocol

Demographic Questions about Student

E-mail the following demographic questions about the participating student to the participating teacher.

1. Name: _____

2. Grade (*circle one*):

   K   1   2   3   4   5   6   7   8   9   10   11   12

3. Age: _____

4. Gender: _____

5. What is the student's status?

   - general education
   - special education
   - English as a second language education

6. Does this student have an individualized learning plan, such as an IEP, 504, or EL?

   - Yes
   - No

If yes, what type? _____

_____

In-Person Teacher Interview

Estimated Time: Approximately 30 min.

Step 1: Questions about Student Participating in Demonstration

"We're going to ask you a few questions about _____, whom you identified as a student who uses an accessibility feature or accommodation in your class."

1. Tell me about _____ as a learner. What kinds of support does the student need in class to be successful?

2. What accessibility feature or accommodation is this student going to demonstrate for us today? When does this student typically use the accessibility feature or accommodation?

3. What task will the student do today to show us how he/she uses the accessibility feature or accommodation?

4. How was this accessibility feature or accommodation selected for the student? Who was involved in the decision?

5. How was the student introduced to using the accessibility feature or accommodation? Was it easy or hard to learn to use?

6. How has the student responded to this particular accessibility feature or accommodation?

7. How do the accessibility features and accommodations this student uses in class compare to what the student will use on state tests?

8. How could your school, district, or state department of education support you so that you can make the best possible accessibility and accommodations decisions for this student?

9. Is there anything else you would like to add about this particular student's use of accessibility features and accommodations?

Step 2: Closing

"Thanks so much for participating in this research. You've given us a lot of great information. Here's a [fifty-dollar gift certificate] as a thank-you for your time."

Student Demonstration

Estimated time: Approximately 45 min.

Step 1: Introduction

"Hi there! Our names are _____ and _____. We work at the National Center on Educational Outcomes. Your teacher told us that you would be able to help us by talking about some of the supports you use on tests and during class. We'll be doing two different activities together. First we'll ask you some questions about the supports you use on tests and during class. Then we'll ask you to do [homework / classwork / assessment] while using those supports. The information we collect will help the people at our work make tests and classes better for all students who need special supports.

"This is not a test and you're not being graded. This is not for your school or your teacher. It's only for us. It should take around 45 minutes to finish.

"Your parents have given us permission to talk with you, but you can decide whether to participate or not. You can decide at any point that you want to stop. It isn't a problem if you decide not to participate.

[Have students read and sign assent form if under 18.]

"Thanks so much for your help today. We know that you'll do your best.

"Do you have any questions before we start? You can ask us questions at any point if there is anything that you don't understand or want us to repeat."

Step 2: Questions

"Your teacher has told us that you use _____ [on tests / in class]. We'd like to ask you some questions about _____."

1. Tell us about _____.

2. Who decided that you should use _____? Did you help choose ____?

3. When do you use _____ in [*teacher's name*]'s class? What kinds of activities are you usually doing when you use it?

4. How long have you been using _____? Is it easy or hard to use?

5. What do you like about _____? What do you dislike?

6. How does _____ help you learn?

7. Are there other things that you tried that weren't helpful to you?

8. Are there other things that you don't use that you think would be helpful to you?

Step 3: Demonstration

"We'd like to see how you use _____.

"Please do this [homework / classwork / assessment] the way you usually do it. We'll take notes so we can remember how you're doing your work. You don't need to worry about getting all the right answers."

Step 4: Closing

"Do you have any questions or comments for us?

"Thanks so much for helping us today. You've given us a lot of great information. Here's a [twenty-five-dollar gift certificate] as a thank-you for your time."

Appendix F

Student Assent Form

We are from the University of Minnesota and we are inviting you to be in a research study. We are trying to understand what teachers do in class that helps students learn and take tests. We want to figure out how to help all students learn better and show what they know. Hearing your thoughts will help us understand what is important to students.

If you agree to be in this study, we will ask you to talk with us for about 30 minutes on one day during school hours. We will try to talk to you at a time when you do not miss important work in class. We will ask you to show us some school work you have done using an accommodation or another kind of learning support. We will ask you to show us how to use this learning support. You will have a chance to give your opinions about using them. You may not like some of the learning supports you use in class. You may think that some of these supports don't help you learn better. You may like these supports and can tell us why you like them. It is okay to tell us exactly what you think. We will be sure to keep your answers private. No one else will know what you said. If you complete the interview, you will receive a $25 gift card.

Being in this study is totally up to you, and no one will be mad at you if you don't want to do it. You can ask any questions that you have about this study. If you have a question later that you didn't think of now, you can ask your teacher.

Your teacher talked to your parent(s)/guardian(s) about this interview. They [he/she] know(s) who to call to ask questions.

Signing here means that you have read this paper or someone else read it to you. Signing means you are willing to be in this study. If you don't want to be in this study, don't sign. Remember, being in this study is up to you, and no one will be mad at you if you don't sign this or even if you change your mind later.

Do you agree to be in an interview?

_____   _____
Sign your name   Date

_____   _____
Signature of Researcher Explaining the Study   Date

Appendix G

Accessibility Features and Accommodations for Students with IEPs That Were Named and Observed

Accessibility Features and Accommodations Used by Students with IEPs in Class

- Additional attempts
- Bookshare
- Calculator
- Chunking
- Closed circuit TV
- Curtains/blinds on windows
- Dictation
- Dictionary
- Directions repeated
- Extra/extended time
- Goodnotes
- Google docs
- Google Read&Write
- Gum
- Headphones
- iPad
- Join Me
- Line blocker
- Math games
- Math manipulatives
- Peer support
- Pencil
- Preferential seating
- Read aloud
- Read2Go/Bookshare
- Reduced number of problems
- Resource room
- Scratch paper
- Small group peer work
- Smartboard
- Stickers with math operations
- T-Stool
- Theraband
- Underlining
- VisioBook
- Whisper reading

Accessibility Features and Accommodations Used by Students with IEPs on State Tests

- Calculator
- Color overlay
- Extended time
- iPad
- Paper format
- Read aloud
- Small group
- Zoom

Appendix H

Accessibility Features and Accommodations for English Learners That Were Named and Observed

Accessibility Features and Accommodations Used by English Learners in Class

Accessibility Features and Accommodations	Elementary School Level ELs	Middle to High School Level ELs
Calculator		+
Dictionary: word to word		+
Dictionary: picture word		+
Dictionary: Learner's		+
Dictionary: Thesaurus		+
Quizlet		+
Extra/Extended time	+	+
Google docs		+
Google Translate		+
Glossary (math)		+
Graphic organizer	+	+
Highlighter	+	
Inventive spelling	+	
Inventory of key vocabulary	+	
Journals		+
Manipulatives (math)	+	
Peer small group/pair share	+	+
Preferential seating	+	
Read aloud	+	
Reduced number of problems	+	+
Text compactor		+

Accessibility Features and Accommodations Used by English Learners on State Tests

- Dictionary (word to word)
- Highlighter
- Direction clarification
- Glossary (word to word)
- Small group