Supporting English Learners through Technology: What Districts and Teachers Say about Digital Learning Resources for English Learners

Volume I: Final Report

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Prepared for:

U.S. Department of Education
Office of Planning, Evaluation and Policy Development
Policy and Program Studies Service

Prepared by:

Annette M. Zehler
Atsushi Miyaoka
Brad Chaney
Valerie Orellana
Westat

Philip Vahey
Daniela Torre Gibney
Kaily Yee
SRI Education

Yesim Yilmazel-Sahin
OneWorld Linguistic Consulting, LLC

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U.S. Department of Education
Betsy DeVos
Secretary

Office of Planning, Evaluation and Policy Development
James Blew
Assistant Secretary

Policy and Program Studies Service
Gregory Fortelny
Director

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Content Contact:
Erica Lee
Phone: 202-260-1463
Email: erica.lee@ed.gov

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Executive Summary

English learners (ELs) are one of the fastest growing student demographics in the United States and are a diverse group, representing over 400 different language backgrounds. In the 2015–16 school year, there were 4.8 million EL students in grades K–12 in U.S. public schools, accounting for 10 percent of all enrolled students (U.S. Department of Education 2018). Over school years 2009–10 to 2014–15, 32 states saw increases in their EL student enrollments, and for five of those states, the increases were over 40 percent (U.S. Department of Education 2017a). Also, over the past decades, teachers have gained increased access to digital technologies for instruction (U.S. Department of Education 2017b). For example, as of 2009, almost every public school (98 percent) had internet access and almost all teachers (97 percent) had one or more computers in their classrooms (Gray, Thomas, and Lewis 2010a, 2010b). Many teachers report using Digital Learning Resources (DLRs) to enhance and differentiate their students' language and content area instruction.

To date, there have been no national data to inform the field on whether and how teachers are using digital technologies to instruct EL students. This report describes data collected in school year 2016–17 to learn about the use of DLRs in instructing EL students through a nationally representative survey of districts that enrolled EL students and a teacher survey that included mainstream teachers of EL students and EL specialists. The teacher sample was not nationally representative and those results should be interpreted with caution. The study included six case studies to provide illustrative vignettes and practitioner comments. In addition to this report, the study developed two toolkits, one to inform educators on the range of DLRs and considerations in using DLRs for EL students, and one to inform educational technology developers about recommendations for improving DLRs for instructing EL students.

Key Findings

- Most teachers surveyed reported that they identified specific DLRs for instructing EL students based on the recommendations of fellow teachers and district or school administrators.
- Teachers were more likely to report weekly or daily use of general education DLRs than of DLRs designed primarily for EL students (85 percent vs. 65 percent).
- About two-thirds of teachers surveyed reported using digital references and resources, language tutorials or practice tools, and academic tutorials or practice tools weekly or daily in instructing their EL students.
- The majority of teachers reported that EL students often used DLRs when working independently (61 percent) or as part of a whole class activity (60 percent); few teachers reported assigning EL students to use DLRs outside of class.
- Districts with high-EL student representation were more likely than districts with low-EL student representation to report providing professional development workshops, coaching, and in-class assistance related to DLR use in instructing EL students.
- Across all districts, EL specialists reported fewer hours of professional development in DLR use than did mainstream teachers.

- Frequently reported barriers to using DLRs with EL students were students' lack of DLR access at home, and teachers' needs for EL and technology expertise and for time to learn and use DLRs.
- Educators suggested that DLRs could improve by engaging students in academic content while building language and literacy skills; embedding visual, auditory, and other support features; providing multiple languages; and providing grade-level content and age-appropriate design for older beginner-level EL students.

Study Purpose and Methods

The study describes districts' and teachers' reported use of DLRs for instructing EL students in grades K–12 to inform the field on current practice and to provide findings that may guide future research, practice, or policy to improve EL students' academic achievement and gains in language proficiency.

The study addressed the following questions:

1. How do districts and teachers identify DLRs for instructing EL students?
2. What types of DLRs do teachers use and how do they use DLRs in instructing EL students?
3. What are supports for and barriers to DLR use in instructing EL students?
4. How can educators and technology developers improve the usefulness of DLRs in instruction of EL students?

Methodology and Study Limitations

The study data collection consisted of three main components:

1. **Survey of district administrators in a nationally representative sample of public school districts that enrolled EL students.** Survey instructions were that the survey should be completed by the administrator(s) most knowledgeable about EL student instruction, typically the district coordinator for EL student instruction. Because the number of EL students in a district may influence levels of access to EL resources and the availability of EL-instructional expertise, we stratified the sample of 999 districts by three categories:
    - **High-EL districts** enrolled more than 1,000 EL students and EL students accounted for 10 percent or more of all students.
    - **Moderate-EL districts** enrolled between 101 and 1,000 EL students, or enrolled more than 1,000 EL students and EL students were less than 10 percent of all students.
    - **Low-EL districts** enrolled 100 or fewer EL students.

    Readers should note that high-EL districts generally tend to be much larger in size than low-EL districts, which could also explain differences that are found between these two groups.
2. **Survey of teachers of EL students**, including mainstream teachers and EL specialists, in schools within the sampled districts. Roughly half of the responding teachers were randomly sampled. However, many schools did not provide rosters of teachers instructing EL students; at these schools, the principals were asked to select teachers of EL students to take the survey. Comparisons between the two teacher samples found that those selected by principals were moderately more likely to be EL specialists than in the random sample. Other differences in

teacher characteristics and responses between the two teacher samples were minor. This report combines both teacher samples when reporting the survey findings; thus, the results of the teacher survey are not nationally representative and should be interpreted with caution.

3. **Case studies of six districts and 12 schools.** The case studies provided more in-depth, qualitative data on how districts and schools use DLRs for instructing EL students. The findings from the six case studies provided illustrative vignettes and practitioner comments; however, these data are not nationally representative and cannot generalize to other education settings.

The study defined DLRs as applications (apps), software, programs, or websites that are designed to engage students in learning activities and support students' learning goals. This definition does not include technology hardware; it excludes the computers, laptops, interactive whiteboards, and other devices needed to use the DLRs. Several DLR types were identified within each of three main categories:

1. **Digital Academic Content Tools** are designed to offer academic content resources or engage students in activities to learn academic content or skills including, but not limited to, language and literacy content or skills. Examples are a tutorial on a new math skill, a physics or math simulation, or visual resources such as a short video that describes a geographic formation.
2. **Digital Productivity Tools** are designed to offer resources to help students to plan, document, organize, and analyze content. These tools do not contain academic content; examples include a slide presentation tool, a timeline tool, or a concept-mapping tool.
3. **Digital Communication Tools** are designed to offer resources students can use to communicate, collaborate, network, or share information. These tools do not contain academic content; examples include document-sharing tools to support joint work, or a journal or blog tool.

Study Limitations

As noted above, the teacher sample included both randomly selected teachers and teachers selected by principals. The response rate for teachers selected randomly from rosters was 56 percent. The principal-selected teachers comprised 28 percent (weighted) of the total teacher respondents. While the principal-selected teachers responded similarly to the randomly selected teachers, findings reported for teachers are not nationally representative and the results should be interpreted with caution. There were six case study sites purposively selected to provide examples of districts with high, moderate, and low levels of EL students in the district; these are not nationally representative and the case study data cannot be generalized to the nation as a whole.

Findings

Identification of DLRs and DLRs Provided for Instructing EL Students

Most districts reported using teacher requests as a source for identifying DLRs for EL students.

Classroom teachers (81 percent) and EL specialists (78 percent) were sources[1] that most districts reported using to identify some or most DLRs for EL students specifically. Other sources that the majority of districts reported using to identify DLRs for EL students were school administrators (69 percent), district administrators (68 percent), and a committee that meets to review and select DLRs (60 percent). Similarly, most districts (92 percent) reported that they used classroom teachers as a source for identifying DLRs for students in general education classes, and most also reported using school administrators (83 percent), and district administrators (78 percent) as sources. Other sources that the majority of districts reported using to identify DLRs for general education students were a committee that meets to review and select DLRs (73 percent) and EL specialists (63 percent).

High-EL districts were more likely than low-EL districts to report considering certain support features, such as visual and auditory supports, as very important when selecting DLRs for use with EL students.

Examples of embedded support features include visual images that may help a student to understand new vocabulary and auditory features such as text-to-speech supports that let a student hear the text they are reading. For both high-EL and low-EL districts, visual supports were the most commonly indicated type of support feature; however, almost all (93 percent) high-EL districts versus about three-quarters (74 percent) of low-EL districts reported that they considered visual supports as very important in selecting DLRs for EL students. Other reported support features that showed differences between high-EL and low-EL districts included providing various levels of text difficulty for the same content, including a range of features specifically designed to support EL students, providing auditory supports; and including materials in the languages of the districts' EL students.

In case study districts, administrators commonly noted that they were more likely to agree to a DLR purchase when a number of teachers were already using the DLR, when teachers thought that the DLR was effective in improving students' learning outcomes, or when teachers reported that the DLR was successful in engaging students.

Most teachers surveyed reported that they identified specific DLRs for instructing EL students based on the recommendations of fellow teachers and district or school administrators.

A majority of teachers reported using the following sources: recommendations of fellow teachers (91 percent); district or school administrators (86 percent); professional development sessions on DLRs

[1] Districts responded to an item that listed the five sources. They responded to indicate whether they used each source to identify none, some or most DLRs.

provided by the district (74 percent); online searches (73 percent); technology coaches or specialists (69 percent); and the school's EL specialist (65 percent).

Teachers' Use of DLRs in Instructing EL Students

Eighty-five percent of teachers surveyed reported using DLRs in instructing their EL students.

Of the teachers using DLRs, 62 percent reported using at least one type of DLR daily and an additional 27 percent reported using at least one type of DLR weekly. There were no significant differences in DLR use between mainstream teachers and EL specialists, between teachers in high-EL versus low-EL districts, or based on teachers' years of experience.

Teachers were more likely to report weekly or daily use of general education DLRs than of DLRs designed primarily for EL students (85 percent vs. 65 percent).

This difference also was statistically significant for mainstream teachers (88 percent vs. 69 percent) but not for EL specialists.

In case study interviews, some mainstream teachers explained they often used general education DLRs rather than specialized DLRs designed specifically for EL students so as not to single out EL students by using a different DLR for them. These teachers also believed that the general education DLRs had features that were sufficient to meet the needs of the EL students. For example, they noted that in some DLRs students could click on a word to get the definition in simpler English or to obtain a translation of the word in their home language.

Mainstream teachers were more likely than EL specialists to report that their EL students used general education DLRs on a weekly or daily basis (88 percent vs. 67 percent). Similarly, considering DLRs designed primarily for EL students, mainstream teachers were more likely than EL specialists to report weekly or daily use (69 percent vs. 53 percent).

About two-thirds of teachers surveyed reported using digital references and resources, language tutorials or practice tools, presentation tools, and academic tutorials or practice tools weekly or daily in instructing their EL students.

Depending on the tool, teachers' reported use ranged from 13 percent for video conferencing to 82 percent for use of reference and resources DLRs. Teachers most often reported that they used references and resources (82 percent), language tutorials or practice tools (81 percent), presentation tools (77 percent), and academic tutorials or practice tools (75 percent). Teachers' use of DLRs depended not only on teachers' choices but also on DLR availability; for example, the least used tool reported (video conferencing) was also the least available (43 percent of districts reported that they did not provide DLRs for video conferencing).

The majority of case study teachers of EL students reported that they frequently used digital references and resources tools such as visual images (photo and video) together with presentation tools, such as slide-show programs, to support all students, and that they felt this support was especially beneficial for

their EL students. In the survey findings, close to half of teachers in both groups reported use of presentation tools.

The majority of teachers reported that EL students often used DLRs when working independently (61 percent) or as part of a whole class activity (60 percent); few teachers reported assigning EL students to use DLRs outside of class.

In case study interviews, several mainstream teachers stated that both their EL and English-proficient students frequently worked independently at their own pace on the same DLR. However, teachers in two districts commented that EL students sometimes worked on different DLRs while English-proficient students in the class worked on another activity. Mainstream teachers most frequently reported using DLRs in whole class activities to introduce content. For example, they projected slide presentations, images, websites, or videos for the whole class. They also used productivity DLRs with the class to assess learning, such as through apps that can create and administer interactive quizzes to students.

Mainstream teachers were more likely than EL specialists to report that students often worked with DLRs as part of whole-class activities (63 percent vs. 31 percent), in pairs or groups of EL students and English speakers (50 percent vs. 23 percent), and in work with DLRs in pairs or groups of EL students (45 percent vs. 19 percent).

Sixteen percent of teachers surveyed reported that EL students often were assigned to use a DLR to continue learning outside of class, and 10 percent of teachers reported that EL students often were assigned to work with parents or other family members at home using a DLR. Several teachers in the case study districts noted that they generally did not assign DLR use for students outside of the classroom given their concern that some students might not have access to computers, DLRs, or internet capacity at home.

Supports for and Barriers to DLR Use

Districts were less likely to report providing professional development and other supports for DLR use for instructing EL students specifically as compared with professional development and supports for instructing general education students

For example, 38 percent of districts reported providing workshops on the integration of DLRs in instruction of EL students specifically versus 75 percent of districts providing such workshops for instruction of students in general education classes. Also, 32 percent of districts reported providing direct coaching support to teachers to assist them in integrating DLR use in instructing EL students specifically compared with 58 percent of districts reporting such coaching provided for instructing general education students. There were similar differences in other types of support for DLR use. While 45 percent reported providing access to online sources of professional development focused on DLR use with EL students specifically, 72 percent reported providing such access for teachers instructing general education students.

High-EL districts were more likely than low-EL districts to report providing professional development workshops, coaching, and in-class assistance related to DLR use in instructing EL students.

There were large differences between the two district groups for four types of professional development. High-EL districts were more likely than low-EL districts to report providing workshops on features of a specific DLR (72 percent vs. 36 percent), workshops on integration of DLRs in instruction (60 percent vs. 30 percent), direct coaching support to integrate DLR use (54 percent vs. 24 percent), and one-on-one in-classroom assistance on how to use a specific DLR (50 percent vs. 29 percent).

Across all districts, EL specialists reported fewer hours of professional development in DLR use than did mainstream teachers.

EL specialists (72 percent) were more likely than mainstream teachers (47 percent) to report receiving one to 10 hours of professional development related to DLRs over school years 2014–15 to 2016–17. The two subgroups were almost equally likely to report receiving no hours of professional development related to DLRs (13 percent and 12 percent, respectively). Combining these findings, EL specialists (84 percent) compared with mainstream teachers (60 percent) were more likely to report either 10 or fewer hours of professional development on DLRs over the three-year period. In contrast, at the upper range of hours reported, mainstream teachers (31 percent) were more likely than EL specialists (7 percent) to report receiving more than 25 hours of professional development.

Some case study teachers of EL students described the professional development they typically received as focused on how to use specific features or functions of a DLR rather than how to incorporate DLRs into their instruction of EL students. For example, the teachers noted that the professional development focused on specifics such as how to set up student accounts, how students should log in, or how students could access audio features to listen to an unfamiliar word.

Seventy-eight percent of teachers reported that students' lack of internet access at home to DLRs was a barrier to their use of DLRs for instructing EL students.

About half of these teachers (41 percent of all teachers) reported that students' lack of internet access at home to DLRs was a barrier to a large extent. A similar percentage of teachers also reported that students lacked home access in ways other than a lack of internet capacity (79 percent) (e.g., lack of computers in the home), with 37 percent indicating this was a barrier to a large extent. Several case study teachers reported that lack of DLR access at home prompted them to not assign homework that would require students to use DLRs at home.

Most teachers surveyed reported that time required to learn to use DLRs (78 percent) and to set up or trouble-shoot DLRs (80 percent) were barriers to their use of DLRs for instructing EL students to some extent or to a large extent. In addition, about two-thirds of teachers reported that the following were barriers to some extent or to a large extent: time to find DLRs (68 percent); lack of knowledge of available DLRs and how to choose among them (67 percent); costs of DLRs (67 percent); lack of professional development on how to use specific DLRs (63 percent); and difficulty in finding DLRs appropriate to their students' needs (63 percent).

Recommendations to Improve the Usefulness of DLRs for Instructing EL Students

Districts and teachers provided suggestions on how DLRs and their use could be improved to better support EL students in learning language and content. These included engaging EL students in working with academic content while building language and literacy skills; providing embedded visual, auditory, and other support features to help EL students to understand and work with the content in all DLRs; providing supports in multiple languages to address a broader range of EL students' home languages; and providing grade-level content and age-appropriate design for older beginning level EL students, such as newcomers.

Additional recommendations were related to implementation and included: ensuring that DLRs are easy to use for students and for teachers; providing teachers with professional development on integrating DLR use in instruction, especially hands-on training and coaching; and assisting districts and teachers to understand the range of DLRs available, how to select among them, and how to determine which DLRs are appropriate for their EL students.

Conclusions

This study sought to understand how districts and teachers identified DLRs they used with EL students, the range of DLRs used and how they are used, and the supports for and barriers to using DLRs in instructing EL students. Most districts reported that they placed a high priority on using DLRs and most teachers reported that they used DLRs in instructing their EL students. Some findings suggest there are differing needs and instructional challenges for mainstream teachers of EL students and EL specialists, and differing resources available among districts with different levels of EL students. These may be useful to consider when conducting research or developing guidance to support DLR use with EL students. The results also describe educators' suggestions for educational technology developers and district leaders on steps to improve DLRs and their use in instructing EL students. Further research is needed to understand the efficacy of these recommendations and of practices in using DLRs when instructing EL students— including EL students with disabilities and their requirements for accessibility. Such research could inform guidance for educators in selecting and using DLRs to better support learning for all EL students, as well as for students overall in grades K–12.

Chapter I. Introduction

English learners (ELs) are one of the fastest growing student demographics in the United States, and are a diverse group, representing over 400 different language backgrounds. In the 2015–16 school year, there were 4.8 million EL students in grades K–12 in U.S. public schools, accounting for 10 percent of all enrolled students (U.S. Department of Education 2018). Over school years 2009–10 to 2014–15, 32 states saw increases in their EL student enrollments, and for five of those states, the increases were over 40 percent (U.S. Department of Education 2017a). Also, over the past decades, teachers have gained increased access to digital technologies for instruction (U.S. Department of Education 2017b). For example, as of 2009, almost every public school (98 percent) had internet access and almost all teachers (97 percent) had one or more computers in their classrooms (Gray, Thomas, and Lewis 2010a, 2010b). Many teachers report using Digital Learning Resources (DLRs) to enhance and differentiate their students' language and content area instruction.

To date, there have been no national data to inform the field on whether and how teachers are using digital technologies to instruct EL students. This report describes data collected in school year 2016–17 to learn about the use of DLRs in instructing EL students through a nationally representative survey of districts that enrolled EL students, a teacher survey that included mainstream teachers and EL specialists, and six case studies. In addition to this final report, the products of the study included two toolkits, one to inform educators on the range of DLRs and considerations in using DLRs for EL students and one to inform educational technology developers about recommendations for improving DLRs for EL students.

Study Purpose and Methods

The study describes districts' and teachers' reported use of DLRs in instructing EL students in grades K–12 to inform the field on current practice and to provide findings that may guide future research, practice, or policy to improve EL students' academic achievement and gains in language proficiency.

The study addressed four questions:

1. How do districts and teachers identify DLRs for instructing EL students?
2. What types of DLRs do teachers use and how do they use DLRs in instructing EL students?
3. What are supports for and barriers to DLR use in instructing EL students?
4. How can educators and technology developers improve the usefulness of DLRs in instruction of EL students?

Some EL students are also students with disabilities. For these students, accessible technology used in the classroom can remove barriers to important educational content.[2] However, this study did not

[2] All public school students with disabilities have rights under Title II of the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. (42 U.S.C. 12134; 29 U.S.C. 794; 28 C.F.R. Part 35; 34 C.F.R. Part 104). For more information on the rights of students with disabilities, see www.ed.gov/ocr/frontpage/faq/rr/policyguidance/disability.html.

examine technology use in instructing EL students with disabilities as a separate group; this could be a topic for a separate study.

Methodology

The study conducted a district survey and a teacher survey in the 2016–17 school year. In addition, case studies in six districts provided further insights through on-the-ground descriptions and examples of DLR use in instructing EL students related to the study questions.[3]

District Survey Sample

The sample design for the district survey was a nationally representative stratified random sample of 999 public school districts that enrolled at least one EL student, as identified in the 2013–14 National Center for Education Statistics (NCES) Common Core of Data (CCD) Local Education Agency Universe File. Because the number of EL students in a district may influence levels of access to EL resources and the availability of EL-instructional expertise, we stratified the sampling frame of districts that enrolled EL students into three categories of EL student representation (Exhibit 1).

Exhibit 1. U.S. public school districts that enrolled EL students: number of districts, percentage of districts, number of EL students, and total number of students enrolled, in three categories of EL student representation, 2013–14

Category	Definition	Number of districts	Percentage of districts	Number of EL students	Total number of students
High-EL districts	Enrolled more than 1,000 EL students and EL students accounted for 10 percent or more of the total student population	624	6%	3,045,683	14,233,565
Moderate-EL districts	Enrolled between 101 and 1,000 EL students, or enrolled more than 1,000 EL students and EL students were less than 10 percent of all students	2,645	24%	1,251,274	20,624,534
Low-EL districts	Enrolled 100 or fewer EL students	7,700	70%	178,929	15,500,218
Total		**10,969**	**100%**	**4,475,886**	**50,358,317**

Exhibit reads: High-EL districts were districts that enrolled more than 1,000 EL students and EL students accounted for 10 percent or more of the total student population. There were 624 high-EL districts, representing 6 percent of U.S. public school districts that enrolled EL students in 2013–14, with 3,045,683 EL students and 14,233,565 total students enrolled.

Source: 2013–14 National Center for Education Statistics (NCES) Common Core of Data (CCD) Local Education Agency Universe file.

[3] See Appendix A in Volume II: Technical Appendices for a more detailed discussion of the methodology and Appendix D for the data collection instruments.

Readers should note that high-EL districts generally tend to be much larger in size than low-EL districts, which could also explain differences that are found between these two groups. The sample included 333 districts in each of the three strata. The use of strata with equal sample sizes is the most efficient design for making comparisons among the strata, helps to ensure that key subgroups are adequately represented in the sample, and improves the sampling precision for selected subgroup estimates. As a result, both high-EL districts and moderate-EL districts were oversampled relative to their frequency among all public school districts. For example, if all districts were sampled with equal probability, then only 57 high-EL districts would be selected, which would be too few to provide reliable estimates and support comparisons with low-EL districts.

The district surveys were directed toward the administrator(s) most knowledgeable about instructional services for EL students, such as the district coordinator for EL student instruction, and respondents were encouraged to include input from other administrators as needed. The study reports findings from a total of 767 districts (269 high-EL, 265 moderate-EL, and 233 low-EL districts), a response rate of 79 percent overall. The response rates by strata were: high-EL districts, 81 percent; moderate-EL districts, 80 percent; and low-EL districts, 76 percent. Appendix B summarizes characteristics of the districts.

Teacher Survey Sample

The teacher sample was designed to be a stratified probability sample of 1,200 teachers from 600 schools to be randomly selected from 600 subsampled districts. To be eligible for the teacher sample, a teacher must have taught at least one EL student in the 2016–17 school year. The teacher sample was divided into two equal groups:

- **Mainstream teachers** included teachers whose primary responsibility was instruction of students in a school's main grade-level classroom or content area class that was not structured as specialized instruction for EL students and who instructed one or more EL students.
- **EL specialists** included those who taught English as a Second Language or English Language Development classes, bilingual or dual language immersion classes or programs, sheltered instructional classrooms, newcomer classes, and/or other specialized instructional services designed for EL students.

To select the teacher sample, we oversampled 743 districts from the district sample (to help ensure 600 participating schools), then randomly selected schools, using district lists of schools that indicated EL student enrollment. To identify sampled teachers, we asked schools to provide a list of teachers that indicated which teachers taught EL students. However, this approach to selecting a nationally representative sample of teachers of EL students ultimately was not successful given low levels of district participation. Challenges included school and district policies against releasing teacher names, reluctance to release teacher names, and difficulty identifying teachers of EL students. Consequently, we adjusted the teacher sampling strategy in two ways. First, we increased the target number of teachers per school from two teachers to six teachers. The revised sampling process resulted in selection of 593 teachers from 163 schools that provided teacher lists for sampling (22 percent of 736 sampled schools). Second, we revised the teacher sampling process. In schools that had not provided a list of teachers and had not refused to participate in the study (67 percent of sampled schools), we asked principals to select up to six teachers to be surveyed, with the instructions that the teachers must instruct EL students in the current year and that both mainstream teachers and EL specialists be included, where both served EL students in the school. For these schools, it was not possible to know the number of eligible teachers

(e.g., there may have been fewer than six) or the number of teachers that principals selected, since the schools did not provide a list of teachers or information on which teachers received surveys.

There were a total of 717 teacher surveys received (60 percent of the planned total of 1,200). Of these, 11 indicated that the teacher did not teach EL students in the current year, resulting in 706 teacher survey respondents (59 percent of the planned total). Overall, there were 332 school list-selected respondents (47 percent of all respondents, unweighted; 72 percent, weighted) from 136 schools and 374 principal-selected respondents (53 percent of all respondents, unweighted; 28 percent, weighted) from 127 schools). The response rate for list-selected teachers was 56 percent (based on 593 sampled teachers). It is not possible to calculate a response rate for the principal-selected teachers since there was no way to know the number of teachers who taught EL students at each school. Overall, the findings are based on responses from 457 mainstream teachers of EL students, 232 EL specialists, and 17 teachers of unknown teacher type. Appendix B summarizes the surveyed teachers' background characteristics.

By asking principals to select the teachers, there was a potential that principals could, intentionally or unintentionally, select teachers who differed in systematic ways from the overall teacher population. To examine this possibility, the study team compared the list-selected teachers and those chosen by the principals. There appeared to be a slight tendency for principals to have selected those teachers who were most easily identified as teaching EL students, such as EL specialists, and correspondingly, a slight tendency for overall teacher data to be more like the responses of EL specialists than otherwise would be expected.

However, the school-list selected group and the principal-selected group were highly similar in both their teacher characteristics and in their survey responses. Overall, the impact of including the principal-selected teachers appears to have been relatively minor, both because the differences in teacher characteristics and in survey responses were small and because EL specialists constitute a relatively small proportion of the population. Still, additional unknown biases from the principals' involvement in the sample selection may exist. Thus results from the teacher survey should be considered as estimates and are not nationally representative.

Case Study Sample

Six districts were purposively selected for case studies: two districts each with high-EL, moderate-EL, and low-EL student concentration. In addition, the final six districts varied in characteristics of the EL student population (home language and number of students), EL program types, urbanicity (based on the U.S. Department of Census geographic locale codes), geographic region, and districts with and without a stated technology plan. Researchers visited each district for two days and conducted interviews with district-level respondents and school leaders and teachers at two schools in each district (12 schools across the six districts). Across the six districts, there were a total of 65 interviews, including 17 district administrators and 48 school administrators and teachers. Thirty-two of the interviewed teachers provided a demonstration of a DLR they commonly used, and the project team conducted classroom observations of 13 mainstream teachers and five EL specialists.

Analysis and Reporting of Findings

Surveys

Data in this report are often presented in two formats: as overall findings and disaggregated by key subgroups. More specifically, district findings include comparisons of high-EL districts versus low-EL districts when these include statistically significant differences. Similarly, the report presents findings when these include statistically significant differences for teacher responses by type of teacher (mainstream teachers versus EL specialists); for teachers in high-EL districts versus those in low-EL districts; for elementary versus secondary teachers; and for first-year versus more experienced teachers.

The survey data were weighted to adjust for the probability of selection and nonresponse. Unless specified otherwise, all findings in this report are based on weighted data and are for the 2016–17 school year, and statements of comparison (e.g., that mainstream teachers were more likely to give a certain response than EL specialists) are reported only if the difference was statistically significant at $p<.05$. The statistical tests used were either independent t-tests or, when the comparisons were not across independent groups, chi-square tests. Some exhibits present a large number of comparisons (up to 15), increasing the chance that a comparison might appear significant by chance; to adjust for the risk of multiple comparisons, Bonferroni corrections were applied.

To assist the reader, the exhibits use color schemes to distinguish different types of analysis, as follows:

Red	Findings for all districts
Blue	Comparisons between high-EL and low-EL districts
Orange	Findings for all teachers
Purple	Comparisons between mainstream teachers and EL specialists
Green	Comparisons between teachers in high-EL and in low-EL districts

Case Studies

All recorded interviews were transcribed and the transcriptions coded using qualitative analysis software (Dedoose). Researchers applied initial codes relevant to each research question and expanded and refined the codes through an iterative process in which emerging themes were identified. The research team discussed the key themes emerging within individual sites and examined dimensions of similarity and variation across districts and across types of respondents. The report integrates case study findings to offer illustrative vignettes and practitioner comments related to DLR use in instructing EL students.

DLR Framework and Definitions

As defined in this study, DLRs are applications (apps), software, programs, or websites that are designed to engage students in learning activities and support students' learning goals.[4] This definition specifically does not include technology hardware; it excludes the computers, laptops, interactive whiteboards and other hardware or infrastructure needed to use the DLRs. The study's framework examined DLRs in three broad categories, based upon the key content and purposes of the tools:

1. **Digital Academic Content Tools** are designed to offer academic content resources or engage students in activities to learn academic content or skills including, but not limited to, language and literacy content or skills. Examples are a tutorial on a new math skill, a physics or math simulation, or visual resources such as a short video that describes a geographic formation.
2. **Digital Productivity Tools** are designed to offer resources to help students to plan, document, organize, and analyze content. These tools do not contain academic content; examples include a slide presentation tool, a timeline tool, or a concept-mapping tool.
3. **Digital Communication Tools** are designed to offer resources students can use to communicate, collaborate, network, or share information. These tools do not contain academic content; examples include document-sharing tools to support joint work, or a journal or blog tool.

Developers often combine multiple related DLRs from one or more DLR categories into a single unified academic product, termed here an **Integrated DLR Set**, providing teachers and students with multiple tools available in what is intended to be a seamless context**.** A district might purchase a district-wide license for its use or purchase licenses for use in selected subject areas or by selected teachers, either as a core curriculum or as a supplemental resource for instruction.

The full set of types of DLRs used in the data collection is found in the sample questionnaires in Appendix D. For brevity, and to focus on major themes in the data, this report discusses a collapsed set of DLR types, as shown in Exhibit 2.

[4] The study DLR Framework was based upon and further refined an initial framework defined in Zehler et al. 2012.

Exhibit 2. Categories and types of DLRs discussed in this report

DLR category	DLR types	Description
Academic Content Tools	Language tutorials/practice*	Tutorials, lessons, and practice and assessment tools focused on basic English vocabulary, language skills, and/or literacy.
	Academic tutorials/practice*	Tutorials, lessons, and practice and assessment tools focused on math, science, and/or other academic content areas.
	References and resources	References and resources such as dictionaries, encyclopedias, and topic-focused blogs, websites, e-books, and videos, designed as K–12 resources.
	Simulations/virtual worlds	Simulations, dynamic modeling tools, or virtual worlds that immerse students in interactive environments to build academic skills or knowledge.
	Websites	Commercial and other websites or resources not designed as content for K–12 learning activities, such as an online product site (*teacher survey only*).
	Translation	Tools that assist students by providing a translation to another language.
	Articulation	Tools that inform and assist students to pronounce and speak a language accurately, such as through images and record-and-compare activities.
Productivity Tools	Presentation	Tools that enable students to present information such as in a slide presentation or in a digital story they publish; these may include music, images and/or video.
	Information organization	Tools that assist students in representing content, such as concept-maps that show relationships among sets of information, and story-templates that assist students to communicate a narrative using text and/or images.
	Spreadsheets	Spreadsheet and data analysis tools that enable students to organize, track, analyze and summarize information.
Communication Tools	Collaboration	Document-sharing tools or other tools that provide an online platform where students can work on products together.
	Blogs, chats, journals	Discussion boards, blog, chat, journal and/or other tools to share perspectives with others or to use for reflection on experiences.
	Video-conferencing	Conferencing and meeting tools to remotely see and speak with others.

*Report findings for this type of DLR includes data from up to three related survey items. See Appendix A for details on these items.

Study Limitations

The teacher findings are estimates based on a combined sample of randomly selected teachers and teachers selected by principals. The response rate for teachers selected randomly from rosters was 56 percent. The principal-selected teachers comprised 28 percent (weighted) of the total teacher respondents. While the principal-selected teachers responded similarly to the randomly selected teachers, findings reported for teachers are not nationally representative and the results should be interpreted with caution. There were six purposively selected case studies conducted to provide illustrative vignettes and practitioner comments on DLR use in instructing EL students. The case study findings are not nationally representative and may not generalize to the nation as a whole.

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Chapter II. Identification of DLRs and DLRs Provided for Instructing EL Students

This chapter examines districts' approaches to identifying DLRs, the sources district administrators and teachers of EL students[5] used to identify DLRs, and the criteria and embedded support features important to them in selecting DLRs.

Three-fourths or more of districts reported that they gave a high priority to using DLRs, provided a wide range of DLRs to support instruction, and took EL students' needs into account when obtaining DLRs.

Most districts responded that using DLRs was a high priority goal, with 41 percent reporting they strongly agreed and 44 percent somewhat agreed (Exhibit 3). Districts indicated that they provided a wide range of DLRs to support instruction (33 percent strongly agreed; 46 percent somewhat agreed), and roughly three-fourths of districts said that the needs of EL students were taken into account when obtaining DLRs for use in the district (31 percent strongly agreed; 46 percent somewhat agreed).

Exhibit 3. Percentage of districts reporting various approaches to using DLRs

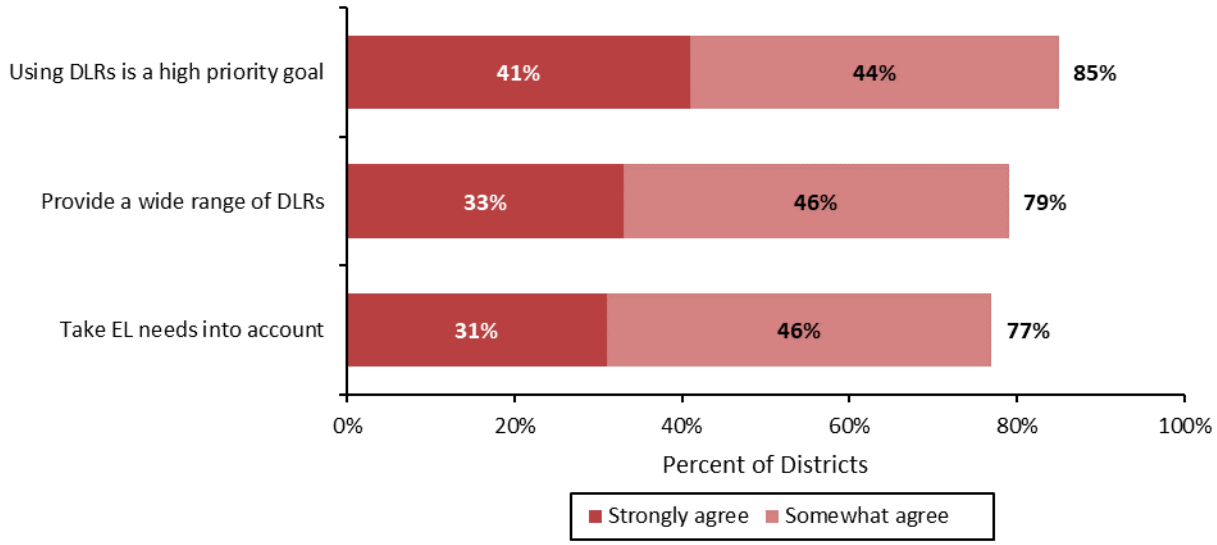

Exhibit reads: Forty-one percent of districts strongly agreed that using DLRs is a high priority goal within their district and 44 percent somewhat agreed, for a total of 85 percent.

Source: District survey, item 8 (*n* = 755 districts).

[5] Readers should note that the teacher survey sample was not nationally representative and these results should be interpreted with caution. See Chapter 1 and Appendix A for additional information about the teacher sample selection.

Sources for Identifying DLRs

Most districts reported using teacher requests as a source for identifying DLRs for EL students.

Classroom teachers (81 percent) and EL specialists (78 percent) were sources[6] that most districts reported using to identify some or most DLRs for EL students specifically. Other sources that the majority of districts reported using to identify DLRs for EL students were school administrators (69 percent), district administrators (68 percent), and a committee that meets to review and select DLRs (60 percent) (Exhibit 4). Similarly, most districts (92 percent) reported that they used classroom teachers as a source for identifying DLRs for students in general education classes, and most also reported using school administrators (83 percent) and district administrators (78 percent) as sources. Other sources that the majority of districts reported using to identify DLRs for general education students were a committee that meets to review and select DLRs (73 percent) and EL specialists (63 percent).

Across the case study districts, many administrators stated that they were more likely to agree to a DLR purchase when a number of teachers were already using the DLR, when teachers thought that the DLR was effective in improving students' learning outcomes, or when teachers reported that the DLR was successful in engaging their students.

Case study teachers noted that in addition to making requests for DLRs to district administrators, they obtained DLRs through other means as well. For example, the teachers mentioned submitting proposals for funding to other sources, making low-cost purchases on their own, and obtaining free DLRs. The teachers commented that they typically requested support for a DLR purchase from their school or district when the DLRs they identified were too costly to purchase on their own. As one mainstream teacher of EL students from the case study explained:

> *"Well, anything that would be free, I would be able to choose. Anything that would need a subscription, I would have to go to the district."*

In two of the case study districts, respondents described a process in which a district committee worked to identify and select DLRs for EL students and general education students. One of these districts reported holding a vendor fair each summer as part of their process. As described by the district respondent, the district committee, consisting of administrators, teachers, technology facilitators, and curricular instructional leaders, would first research DLRs that met the district's goals and showed evidence of effectiveness based on external evaluation. Next, the committee invited the vendors to present during the annual vendor fair. The vendors presented information on their DLRs to administrators, teachers, technology facilitators, and curricular instructional leaders, who then rated each DLR using a district-created rubric. Finally, the committee members discussed each DLR and completed a survey indicating their preferences. The respondent stated that the district administrators used the data from this survey to identify the new DLRs for the district to purchase or obtain.

[6] Districts responded to an item that listed the five sources. They responded to indicate whether they used each source to identify none, some or most DLRs.

Exhibit 4. Sources that districts reported using to identify most or some DLRs for instructing EL students specifically and general education students

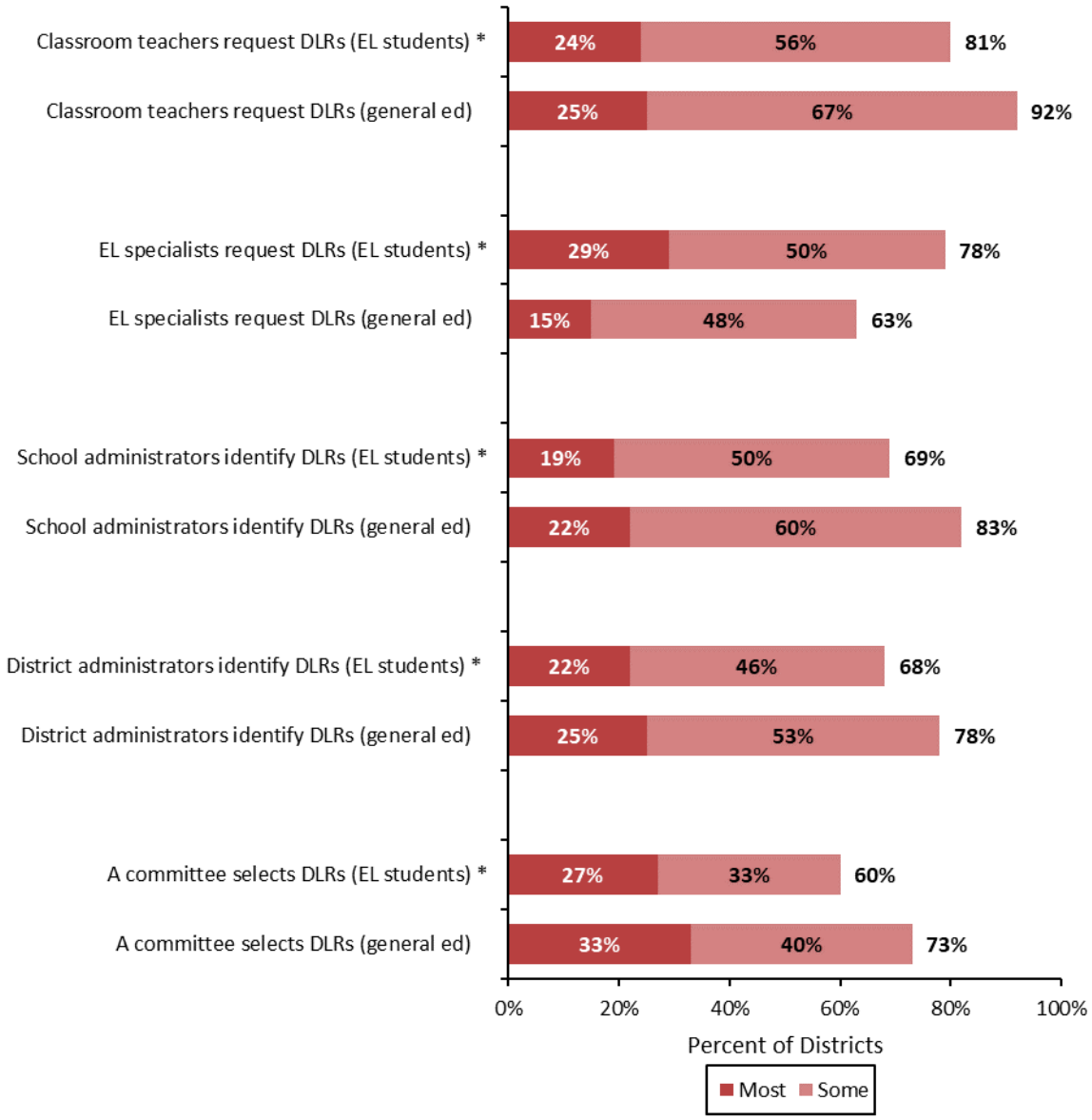

Exhibit reads: Twenty-four percent of districts reported using classroom teachers' requests to identify most DLRs for EL students specifically, and 56 percent reported using classroom teachers' requests to identify some DLRs, for a total of 81 percent. This total is statistically different from the total of 92 percent of districts that reported using classroom teacher requests to identify DLRs for students in general education.

*The total percentage of districts using the source to identify most or some DLRs for EL students specifically is statistically different from the total percentage using the source to identify most or some DLRs for general education students ($p < .05$).

Notes: The total of the percentage reporting "most" and the percentage reporting "some" may differ from the details shown, due to rounding.

Source: District survey, item 11 ($n = 718$ districts).

High-EL districts were more likely than low-EL districts to report using teachers, administrators and committees as sources to identify DLRs for their EL students.

For all five of the listed sources, there were statistically significant differences between high-EL and low-EL districts (Exhibit 5). For example, 81 percent of high-EL districts reported using a committee to select DLRs for EL students versus 51 percent of low-EL districts, and 87 percent reported using a district administrator versus 61 percent.

For high-EL districts, the five sources showed roughly equal levels of use, with each reported as used by between 81 and 88 percent of the districts. By contrast, the percent of low-EL districts that reported using the five sources ranged from 51 percent for use of a committee to 77 percent for use of classroom teachers. EL specialists (72 percent) and classroom teachers (77 percent) were sources low-EL districts often indicated using.

Exhibit 5. Sources that districts reported using to identify some or most DLRs for instructing EL students, in high-EL and low-EL districts

Source	Percentage of high-EL districts	Percentage of low-EL districts	Percentage point difference
A committee selects DLRs*	81	51	30
District administrators identify DLRs*	87	61	26
School administrators identify DLRs*	84	65	19
EL specialists request DLRs*	88	72	16
Classroom teachers request DLRs*	86	77	9

Exhibit reads: Eighty-one percent of high-EL districts reported using a committee to identify some or most DLRs for instructing EL students compared with 51 percent of low-EL districts, a difference of 30 percentage points. This difference is statistically significant.

*Percentage for high-EL districts is statistically different from percentage for low-EL districts ($p < .05$).
Source: District survey, item 11 (n = 249 high-EL districts and 222 low-EL districts).

Most teachers surveyed reported that they identified specific DLRs for instructing EL students based on the recommendations of fellow teachers and district or school administrators.

Ninety-one percent of teachers reported using recommendations from their fellow teachers and 86 percent reported using recommendations from district or school administrators. In addition, the majority of teachers reported using professional development sessions on DLRs provided by the district (74 percent) and online searches (73 percent) as sources for identifying DLRs (Exhibit 6)[7]. Fewer than half (39 percent to 44 percent) reported using recommendations of students or students' families, searches of online DLR collections, online teacher blog sites, and guidance from regional centers. There were no statistically significant differences in reported sources used for mainstream teachers and EL specialists. However, first-year teachers were more likely than experienced teachers to report using recommendations of their fellow teacher as sources (99 percent vs. 91 percent) (Exhibit C-1[8]).

Teachers in the case study districts provided examples of the sources they used. An EL specialist in one district described turning to a teacher whom she viewed as a technology leader in her school. She noted that the "technology leader" was completing her master's degree in teaching EL students and taking courses related to using technology with EL students. The EL specialist commented that this teacher leader offered recommendations to other teachers in the school, and provided guidance both in identifying DLRs and in implementing them with EL students. Other teachers described using online searches to identify DLRs, describing use of websites that allowed them to pin, post, and share ideas and images through social networking. For example, they reported searching for online resources (free and paid) created by other teachers or educators through searches of teacher blogs, and through online microblogging platforms.

[7] Readers should note that the teacher survey sample was not nationally representative and these results should be interpreted with caution. See Chapter 1 and Appendix A for additional information about the teacher sample selection.

[8] Exhibits C-1 and following refer to exhibits in Appendix C in Volume II: Technical Appendices.

Exhibit 6. Sources that teachers reported using sometimes or often to identify DLRs for instructing EL students

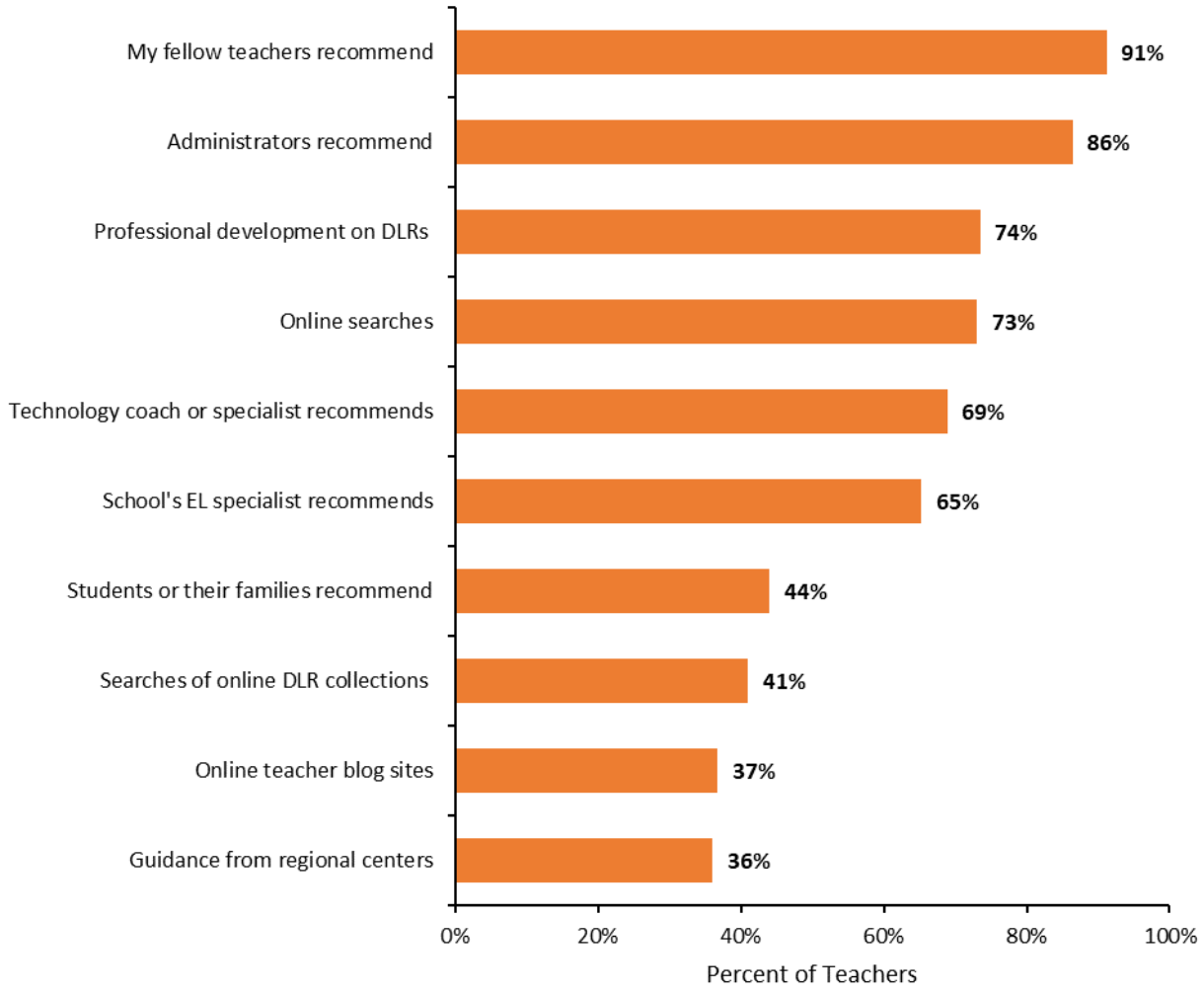

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 91 percent reported that they used the recommendation of their fellow teachers sometimes or often to identify DLRs for instructing EL students.

Notes: Only those teachers who indicated that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 25 (*n* = 557 teachers).

Criteria in Selecting DLRs

When selecting DLRs, over 80 percent of districts reported that they considered it very important that the DLR fit within the district's infrastructure and budget, engage students, align with state standards, have research showing effectiveness, and provide English-language or literacy skills instruction for EL students.

In fact, for 14 of the 16 criteria listed on the district questionnaire, one-half or more of all districts reported considering the criterion as very important to them in selecting DLRs (Exhibit 7). Included among these criteria were two related to selecting DLRs for EL students specifically. Slightly more than half of districts reported that they considered it very important that the DLR was designed for EL students (56 percent) and that the DLR provided mathematics, science, or social studies instruction for EL students (54 percent). The two least commonly used criteria in selecting DLRs were that the DLR can be used by pairs or groups of students to collaborate (44 percent) and that the DLR operates within the student's home internet capacity (41 percent).

Case study respondents cited several of these same criteria as important to their decision making when asked about how their district made decisions on which DLRs to adopt. For example, one district technology coordinator interviewed said that the decision to adopt a DLR was very much driven by the curriculum and that she worked closely with the curriculum staff to decide which tools to bring into the district. This coordinator also said that her district tends to lean towards DLRs that work within their current environment, so that, for example, students and parents do not have to memorize multiple usernames and passwords. District administrators interviewed also consistently cited cost as a key factor they considered when selecting a DLR. Finally, one district administrator stressed the importance of research evidence of effectiveness:

> *"We almost always look for an outside study that was done. Not done by the company themselves to say, 'Look how great our tool is' …we look for that research study that was done by an outside organization. If it has that, it makes the first cut."*

Exhibit 7. Criteria that districts reported were very important in selecting DLRs

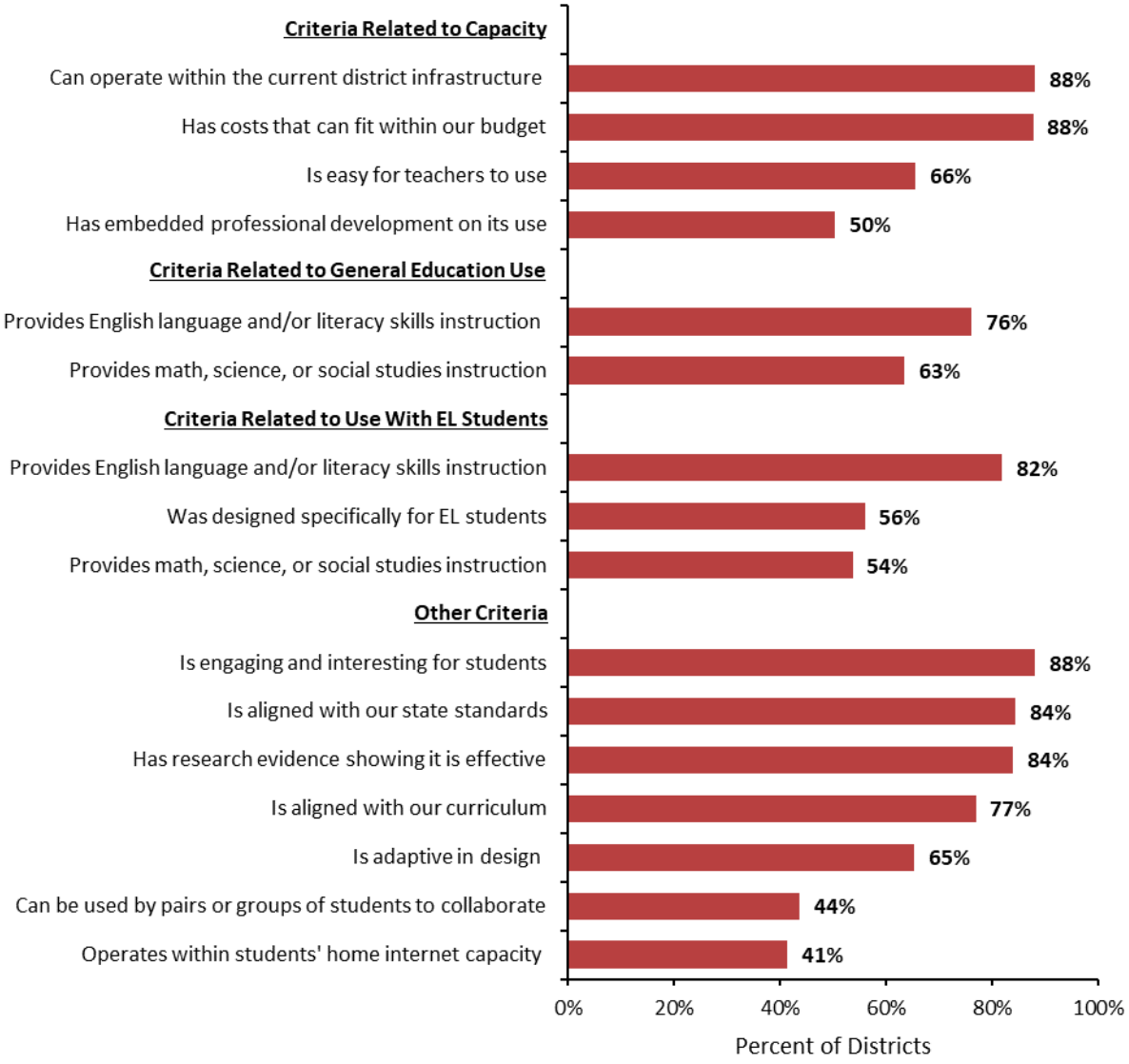

Exhibit reads: Eighty-eight percent of districts reported that whether the DLR can operate within the current district infrastructure is a very important criterion in selecting DLRs.

Source: District survey, item 12 (*n* = 744 districts).

As a rule, high-EL districts and low-EL districts gave similar importance to the various criteria (Exhibit C-2). However, high-EL districts were more likely than low-EL districts to consider it very important for the DLRs to have embedded professional development on its use (70 percent vs. 46 percent); be designed specifically for EL students (70 percent vs. 50 percent); be easy for teachers to use (77 percent vs. 63 percent); and to be aligned with state standards (92 percent vs. 81 percent).

Seventy-nine percent of districts reported that they considered visual support features (such as images that can be used to explain content) as very important when selecting DLRs for use with EL students.

Examples of visual support features include visual images that may help a student to understand new vocabulary. Further, roughly two-thirds of districts reported considering three other types of embedded support features as very important in selecting DLRs for EL students: various levels of text difficulty for the same content (66 percent); having a range of features specifically to support EL students (65 percent); and auditory supports (such as text-to-speech "read alouds" that enable a student to hear the text) (64 percent) (Exhibit 8). Somewhat smaller percentages of districts indicated definitions in simple English, interactive dictionaries, and translation (50 percent to 58 percent), and fewer than half of districts considered providing materials in EL students' languages and a record-and-replay function as very important (43 and 40 percent, respectively).

Exhibit 8. Support features that districts reported were very important in selecting DLRs for instructing EL students

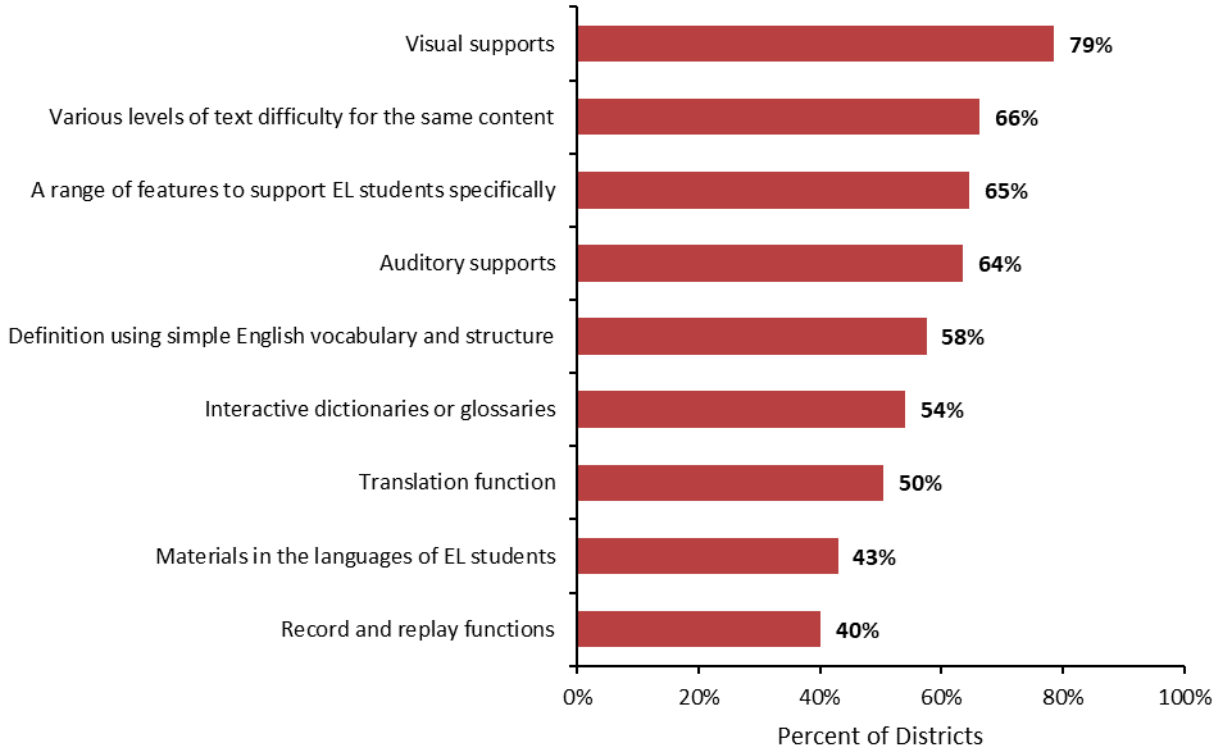

Exhibit reads: Seventy-nine percent of districts reported that whether the DLR can provide visual support to explain or clarify the content and vocabulary is a very important feature in selecting DLRs for use with EL students.

Source: District survey, item 13 (*n* = 720 districts).

High-EL districts were more likely than low-EL districts to report considering certain support features, such as visual and auditory supports, as very important when selecting DLRs for use with EL students.

For both high-EL and low-EL districts, visual supports were the most commonly indicated type of support feature; however, almost all (93 percent) high-EL districts versus about three-quarters (74 percent) of low-EL districts reported that they considered visual supports as very important in selecting DLRs for EL students (Exhibit C-3). Other reported support features that showed differences between high-EL and low-EL districts were: providing various levels of text difficulty for the same content (84 percent of high-EL districts vs. 63 percent of low-EL districts); including a range of features specifically designed to support EL students (83 percent vs. 57 percent); providing auditory supports (78 percent vs. 60 percent); and including materials in the languages of the districts' EL students (59 percent vs. 39 percent) (Exhibit C-3). The two groups of districts were similar in their views regarding other support features. For example, about half of both high-EL and low-EL districts considered an embedded translation function as very important in selecting DLRs for EL students.

Ninety percent or more of teachers reported that in selecting DLRs for instructing EL students it was very important for them that the DLR is easy for students to use, the content is adaptive, and there are various levels of text difficulty for the same content.

In addition, most teachers (82 percent to 86 percent) reported considering alignment with state standards, ease of use for themselves, and alignment with the curriculum as very important. Slightly more than half of teachers indicated as very important to them that the DLR was available through the district or school (60 percent); that it allows students to direct their own learning (58 percent); that other teachers have used the DLR successfully with students (54 percent); and that the DLR engages students in learning activities that are structured as a game (52 percent) (Exhibit 9).

First-year teachers as compared with more experienced teachers were more likely to report that in selecting DLRs for EL students they considered it very important that the DLR is adaptive (99 percent vs. 92 percent); is aligned with state standards (99 percent vs. 85 percent); can be used by students with their parents or families (92 percent vs. 62 percent); and allows students to direct their learning (85 percent vs. 56 percent) (Exhibit C-4).

When asked about the criteria their school uses when considering which DLRs to adopt, case study respondents cited several criteria. The majority of school-level case study respondents mentioned that it should be easy to use for the students and teachers. For example, a teacher said that he really liked a particular DLR that he frequently used in the classroom because he was able to create "class-worthy" activities for his students in just 10–15 minutes. Many case study teachers noted that they especially valued DLRs that were able to keep students engaged while using the program. A mainstream teacher commented,

> *"I want something that's going to keep them interested, that's going to engage them, that's going to give them the knowledge that I want them to have, the content I want them to have, or even just reinforce what I'm teaching."*

Exhibit 9. Criteria that teachers reported were very important in selecting DLRs for instructing EL students

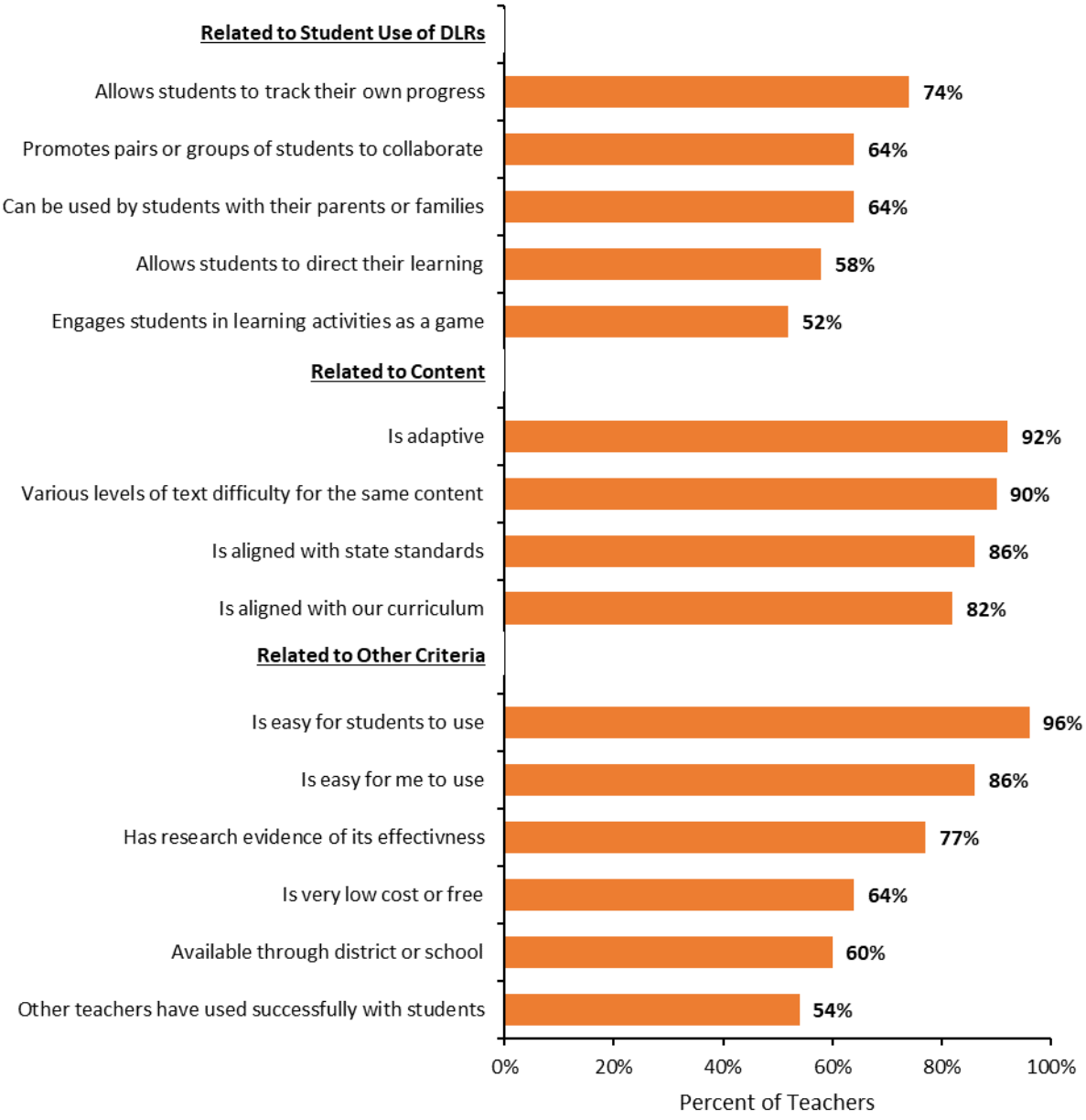

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 74 percent of teachers reported that whether the DLR allows students to track their own progress is a very important feature in selecting DLRs for instructing EL students.

Notes: Only those teachers who indicated that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 26 (*n* = 557 teachers).

A case study principal commented on the importance of DLRs aligning with the school's goals in order to ensure that the DLR effectively meets the needs of all students and helps the school achieve its goals:

> *"...we want it [the DLR] to align with the goals of our school improvement team, our school improvement plan, and make sure that what we're working with and what we're working on is going to not only meet the needs of our learner but meet the needs of the goals of the school because then it always provides us a – a place to go back to."*

Several mainstream teachers and EL specialists, at both upper elementary and secondary grade levels, stated that it was challenging to find DLRs that were age-appropriate for their beginning ELs in higher grade levels. For example, EL specialists noted that DLRs specifically designed to develop students' early literacy skills (e.g., learning the alphabet, decoding, beginning reading, and vocabulary) often used animations or visuals intended for elementary school students. They further noted that DLRs with such juvenile designs were not appropriate for older students and that it was hard to keep their older students engaged using such DLRs. As one secondary EL specialist reported: "You can find reading passages but then they're so baby-looking that some kids don't want to use them once they get to high school."

Most teachers (89 percent) reported that visual support features were very important to them in selecting DLRs for EL students.

In addition to visual supports, three other DLR features were very important to a majority of teachers in selecting DLRs for EL students: definition functions to explain a word or concept using simple English (68 percent), interactive dictionaries and glossaries (61 percent), and text-to-speech functions that let a student hear a word or phrase (60 percent). Fewer than half of teachers indicated that materials in EL students' languages and a record and replay function were very important (Exhibit 10).

Exhibit 10. Support features that teachers reported were very important in selecting DLRs for instructing EL students

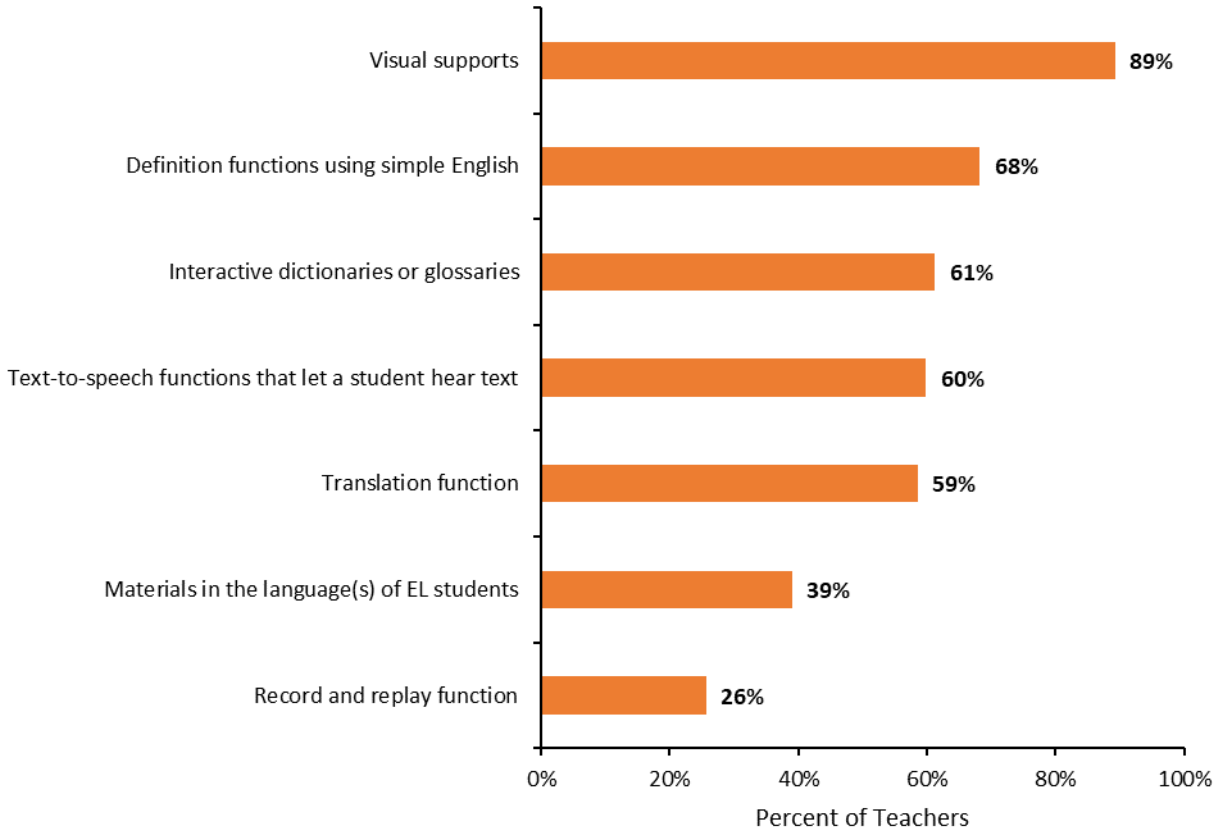

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 89 percent of teachers reported that they considered visual supports for understanding such as images, illustrations, graphics, virtual manipulatives, or video as a very important feature in selecting DLRs for instructing EL students.

Notes: Only those teachers who indicated that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 27 (*n* = 571 teachers).

Mainstream teachers and EL specialists differed on the importance they gave to two DLR functions. Mainstream teachers were more likely than EL specialists to consider a translation function to be very important (63 percent vs. 39 percent), while EL specialists were more likely than mainstream teachers to consider a record and replay function (so students could record and review their own voices) as very important (45 percent vs. 23 percent) (Exhibit C-5).

Many case study teachers commented on the importance of having visual and auditory support components in a DLR to support EL students. For example, they described using images and short videos to help introduce new vocabulary to their EL students rather than relying on text or spoken description alone.

Teachers in high-EL districts were more likely than those in low-EL districts to indicate that they considered support features such as interactive dictionaries and glossaries to be very important in selecting DLRs for their EL students.

Teachers in high-EL districts were more than twice as likely to report that such language support features were very important (73 percent vs. 35 percent) (Exhibit C-6).

There were also differences for teachers of different grade levels and for first-year versus experienced teachers in the features they considered very important in selecting DLRs for instructing EL students. Elementary teachers were more likely than secondary teachers to report that it was very important for DLRs to include a text-to-speech function that lets a student hear a word or phrase (78 percent vs. 35 percent) (Exhibit C-7). First-year teachers were more likely than more experienced teachers to report that it is very important for DLRs to include visual supports for understanding such as images or illustrations (98 percent vs. 89 percent) and to have a translation function (89 percent vs. 57 percent) (Exhibit C-8).

Types of DLRs Provided for Instruction

As described in Chapter I, this study examined DLRs in three broad categories: digital academic content tools, digital productivity tools, and digital communication tools, and within each category, reported on several types of DLRs. Looking very broadly, and considering DLRs for general education students, 99 percent of districts provided at least one DLR, and 85 percent provided DLRs that collectively included academic content tools, productivity tools, and communication tools (Exhibit 11). Districts also almost universally provided at least one DLR specifically for instructing EL students (96 percent), and 68 percent provided DLRs that collectively included the three categories of academic content tools, productivity tools, and communication tools. Again with regard to DLRs specifically for EL students, almost all districts (94 percent) reported providing DLRs with academic content for EL students, 83 percent provided productivity tools and 70 percent provided communication tools.

Exhibit 11. Percentage of districts reporting that they provided various categories of DLRs for EL students specifically and for general education students

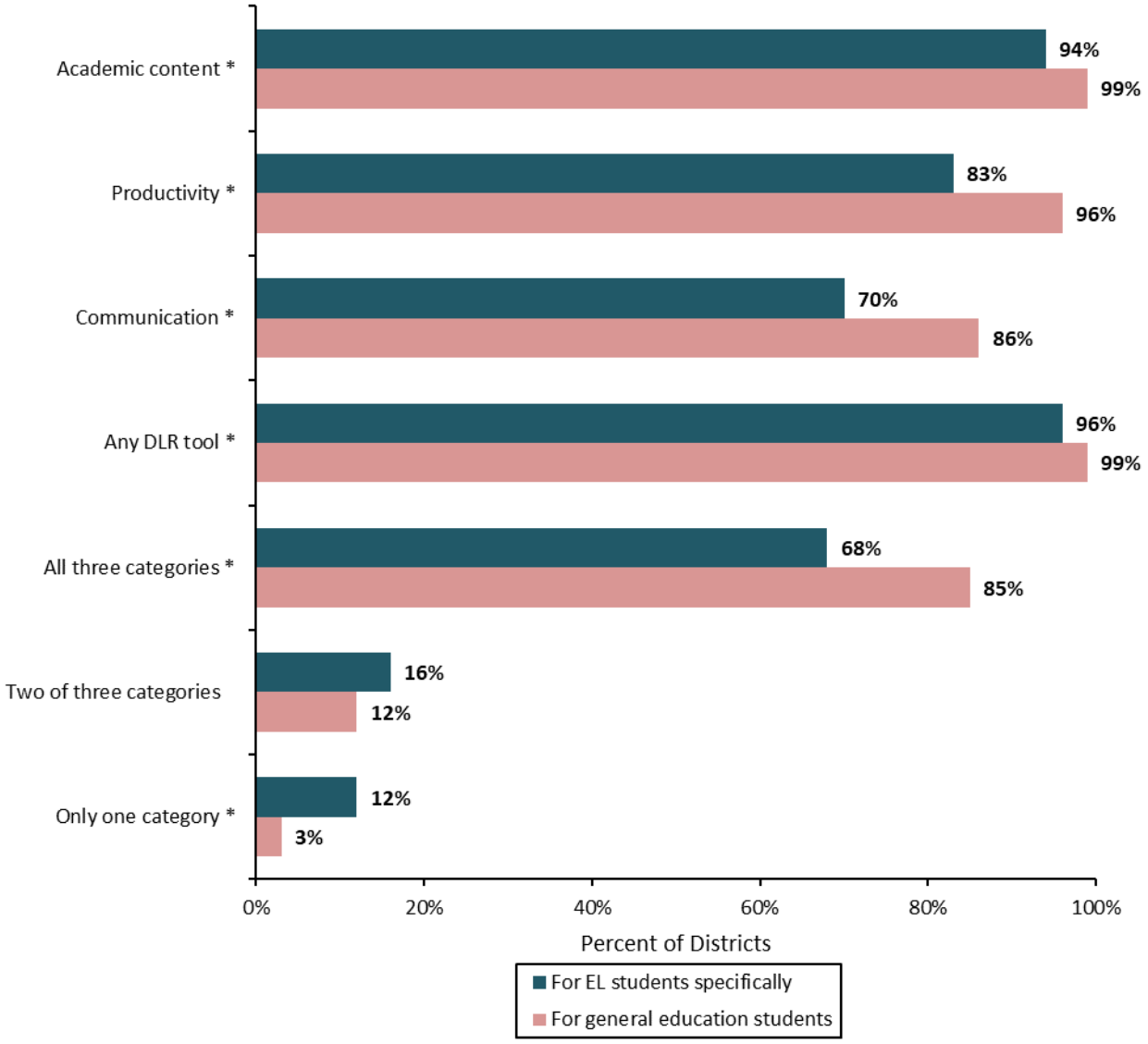

Exhibit reads: Ninety-four percent of districts reported providing an academic content DLR for EL students specifically and 99 percent reported providing an academic content tool for general education students. This difference is statistically significant.

* Percentage for EL students specifically is statistically different from percentage for general education students ($p < .05$).
Notes: "All three categories" refers to the three categories of DLRs: Academic content tools, productivity tools, and communication tools. "Two of the three categories" and "only one category" indicate that a district reported using tools within two, or only one, of these three categories.
Source: District survey, items 9 and 10 (n = 745 districts, for EL students and 749 districts, for general education students).

Ninety-one percent of districts reported providing language tutorials or practice DLRs for EL students specifically.

In addition to language tutorials or practice DLRs, DLRs that districts most often provided for EL students were reference and resources (84 percent), translation (80 percent), academic tutorials or practice (79 percent), and presentation (79 percent) (Exhibit 12). These were consistent with the types of DLRs most districts reported providing for general education instruction: language tutorials or practice, academic tutorials or practice, presentation, and references and resources DLRs (92 percent to 97 percent). The DLRs that districts least commonly reported providing were video-conferencing and simulations or virtual worlds, for general education (57 percent and 67 percent, respectively) and for EL students specifically (42 percent and 49 percent).

Districts were more likely to report providing DLRs for general education students than for EL students specifically.

In some cases, there were substantial differences between the DLRs provided for general education students and those provided specifically for EL students. For example, 96 percent of districts reported providing academic tutorials or practice DLRs for general education students versus 79 percent for EL students specifically. The differences between DLRs provided for general education instruction and for EL students specifically were statistically significant for all DLRs listed, with the exception of translation and articulation DLRs.

Case study teachers in one district reported that their district discouraged or did not permit use of these tools due to their state's English-only policy. Other teachers in the case studies stated they used translation tools to support their EL students' comprehension, for example, in translating directions for newcomer students, who are just beginning to learn English.

High-EL districts were more likely than low-EL districts to report certain types of DLRs, including language tutorials or practice DLRs and productivity and communication DLRs.

The differences between high-EL districts and low-EL districts were in providing language tutorials or practice DLRs (97 percent of high-EL districts vs. 89 percent of low-EL districts); presentation (87 percent vs. 76 percent); information organization (80 percent vs. 69 percent); spreadsheets (79 percent vs. 64 percent); and in blogs, chats, and journals (70 percent vs. 54 percent) (Exhibit C-9). There were no DLR types that low-EL districts were more likely to provide.

Exhibit 12. Percentage of districts reporting that they provided various types of DLRs, for EL students specifically and for general education students

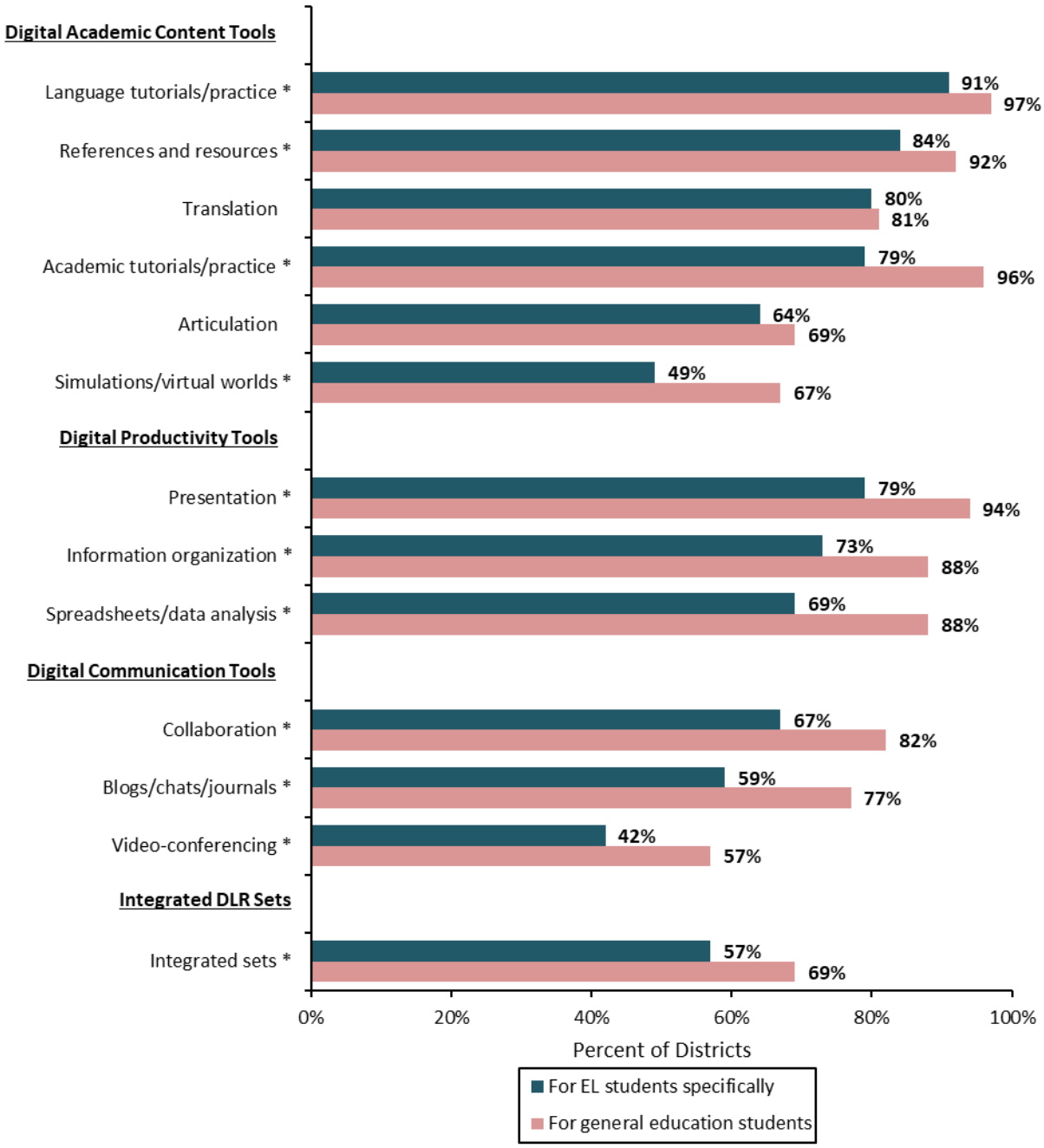

Exhibit reads: Ninety-one percent of districts reported providing language tutorials or practice DLRs for EL students specifically and 97 percent reported providing language tutorials or practice for general education students. This difference is statistically significant.

* Percentage for EL students specifically is statistically different from percentage for general education students ($p < .05$).
Source: District survey, items 9 and 10 (n = 745 districts, for EL students and 749 districts, for general education students).

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III. Teachers' Use of DLRs in Instructing EL Students

This chapter describes what teachers of EL students reported about their use of DLRs in instructing their EL students in the 2016–2017 school year and the indicators that districts and teachers reported using to judge the effectiveness of general education DLRs.[9] Although almost all districts provided DLRs to support instruction of EL students and general education students, teachers' use of those DLRs may vary within or across districts and that variation may be related to teacher or district characteristics. Where there are significant differences between the responses of mainstream teachers and EL specialists or between teachers in districts with high and low concentrations of EL students, we present the results separately for each subgroup. The teacher findings in this chapter are based on the percent of teachers who reported using DLRs when instructing their EL students.

Use of DLRs

Eighty-five percent of teachers surveyed reported using DLRs in instructing EL students.

Of the teachers using DLRs, 62 percent reporting using at least one type of DLR daily in instructing their EL students and an additional 27 percent reported using at least one DLR type weekly (Exhibit 13).[10] There were no significant differences in reported DLR use between mainstream teachers and EL specialists, between teachers in high-EL versus low-EL districts, or based on teachers' years of experience.

[9] Readers should note that the teacher survey sample was not nationally representative and these results should be interpreted with caution. See Chapter 1 and Appendix A for additional information about the teacher sample selection.

[10] Teachers reported their use for different types of DLRs. These percentages are based only on the most frequently used type, as reported by each teacher.

Exhibit 13. Teachers' reported frequency of DLR use in instructing EL students

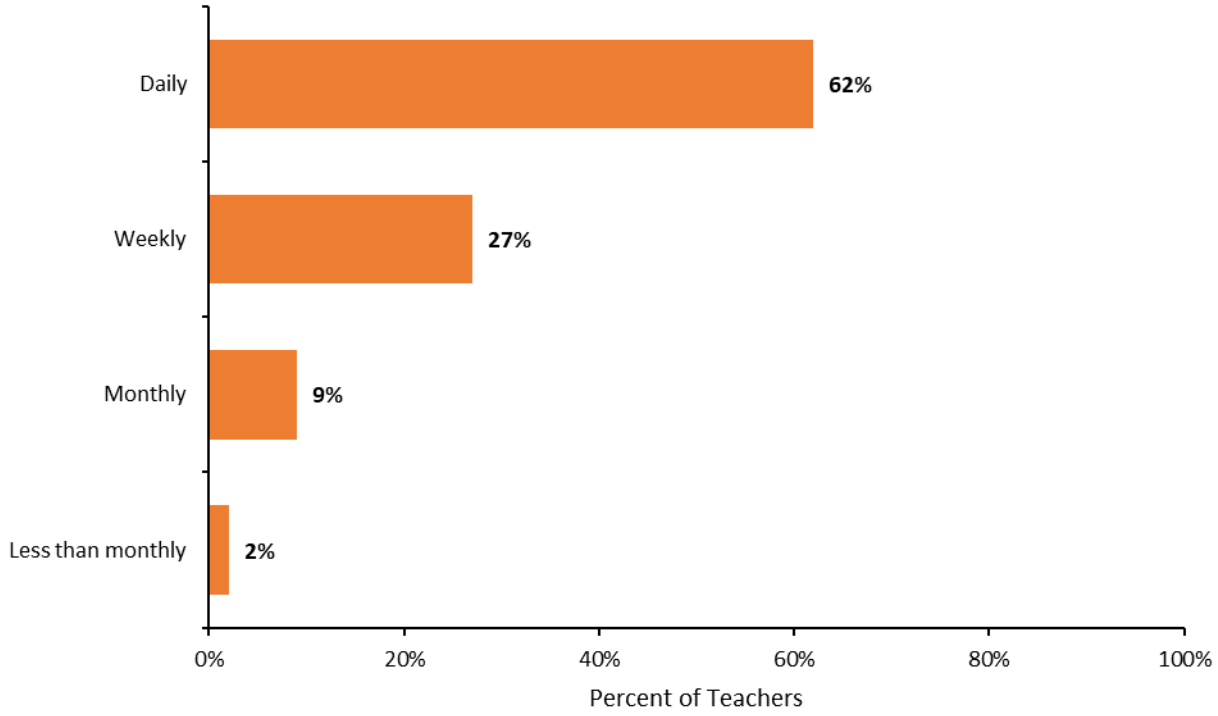

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 62 percent of teachers reported daily use of a DLR in instructing EL students.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item. Frequency was calculated as the highest level of frequency of use for a DLR that a teacher indicated.
Source: Teacher survey, item 23 (*n* = 575 teachers).

Districts, schools, and teachers have a wide range of DLRs to choose from, including DLRs designed for all students and DLRs designed for particular subgroups of students, such as EL students and struggling students.

Among teachers who reported using DLRs for instructing EL students, 79 percent used a combination that included use of DLRs designed for EL students, DLRs designed for struggling students, and DLRs designed for general education students.

Considering each separately, almost all teachers reported at least some use of DLRs designed for general education students (95 percent) and for struggling students (91 percent), and most (84 percent) reported use of DLRs designed for EL students (Exhibit 14).

Exhibit 14. Percentage of teachers reporting at least some use of DLRs, by type of student for whom the DLR was designed

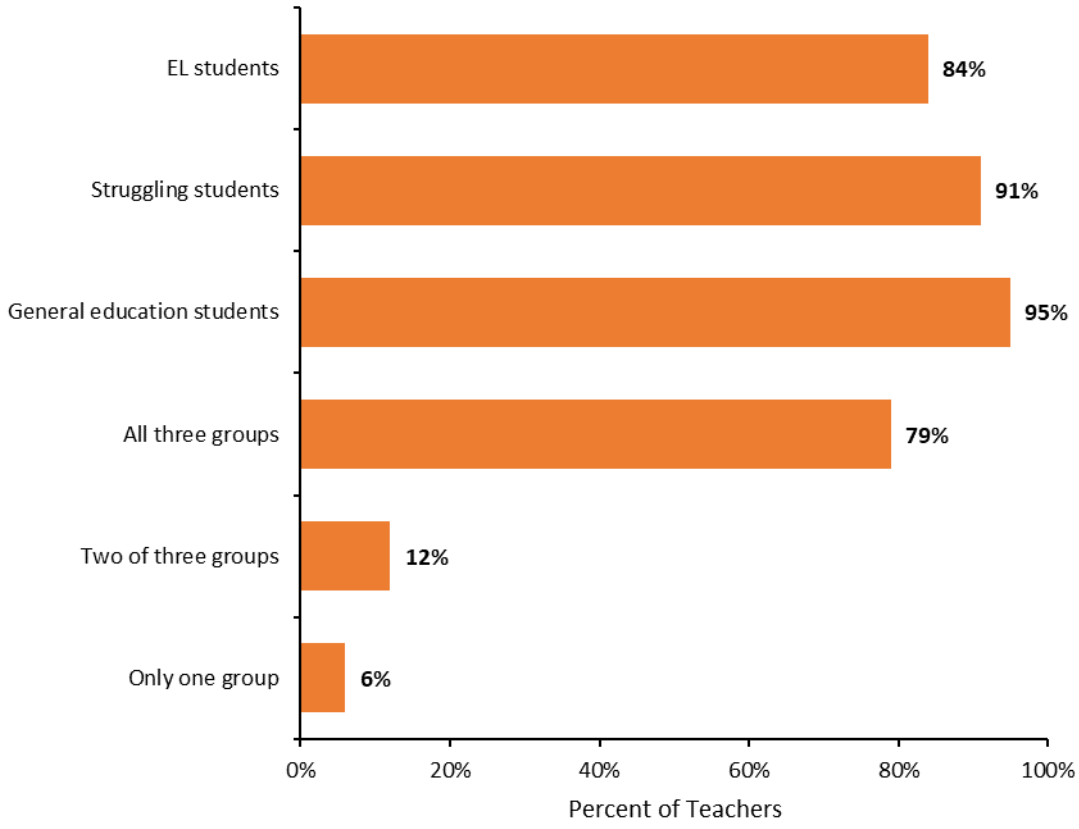

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 84 percent of teachers reported at least some use of DLRs designed primarily for EL students.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item. "All three groups" indicates that an individual teacher reported using a range of DLRs that collectively addressed three groups of students; that is, the teacher reported use of DLRs designed for EL students, DLRs for struggling students, and DLRs for general education students. "Two of the three groups" and "only one group" indicate that the DLRs a teacher reported using were DLRs that collectively addressed two of the three groups or the DLRs were those that addressed one of the groups.
Source: Teacher survey, item 24 (*n* = 574 teachers).

Teachers were more likely to report weekly or daily use of general education DLRs than of DLRs designed primarily for EL students (85 vs. 65 percent).

This difference also was statistically significant for mainstream teachers (88 percent vs. 69 percent) but not for EL specialists (Exhibit 15).[11]

In case study interviews, some mainstream teachers explained that they often included their EL students in using general education DLRs with the rest of the class, so as not to single out the EL students by using a different DLR for them. These teachers also noted that some general education DLRs had features that helped EL students to understand and work with the DLR content. For example, they noted that in some DLRs students could click on a word to get the definition in simpler English or obtain a translation of the word in their home language.

There were differences for some subgroups in reported use of DLRs designed for general education students, for EL students, and for struggling students. Considering the use of general education DLRs separately, mainstream teachers compared with EL specialists were more likely to report using the DLRs in instructing EL students on a weekly or daily basis (88 percent vs. 67 percent) (Exhibit 15). Similarly, considering DLRs designed primarily for EL students, mainstream teachers were more likely than EL specialists to report weekly or daily use (69 percent vs. 53 percent).

Most teachers in high-EL districts reported using DLRs designed specifically for EL students and DLRs for struggling students weekly or daily in instructing their EL students, while about half of teachers in low-EL districts reported daily or weekly use of these DLRs. The difference between the teachers in high-EL districts and teachers in low-EL districts was statistically significant for reported use of DLRs designed for struggling students (85 percent vs. 44 percent) (Exhibit C-10).

First-year teachers more often than experienced teachers reported weekly or daily use of DLRs designed primarily for EL students and DLRs primarily designed for struggling students. Eighty-five percent of first-year teachers versus 65 percent of more experienced teachers reported weekly or daily use of DLRs designed for EL students; and 89 percent versus 68 percent reported weekly or daily use of DLRs designed for struggling students (Exhibit C-11).

[11] Throughout this chapter, note that fewer EL specialists responded to the survey than mainstream teachers (204 EL specialists vs. 356 to 359 mainstream teachers for this analysis, depending on the survey item), resulting in generally larger standard errors for EL specialists.

Exhibit 15. Percentage of teachers reporting that their EL students used DLRs weekly or daily, by type of teacher and by type of students for whom the DLRs were designed

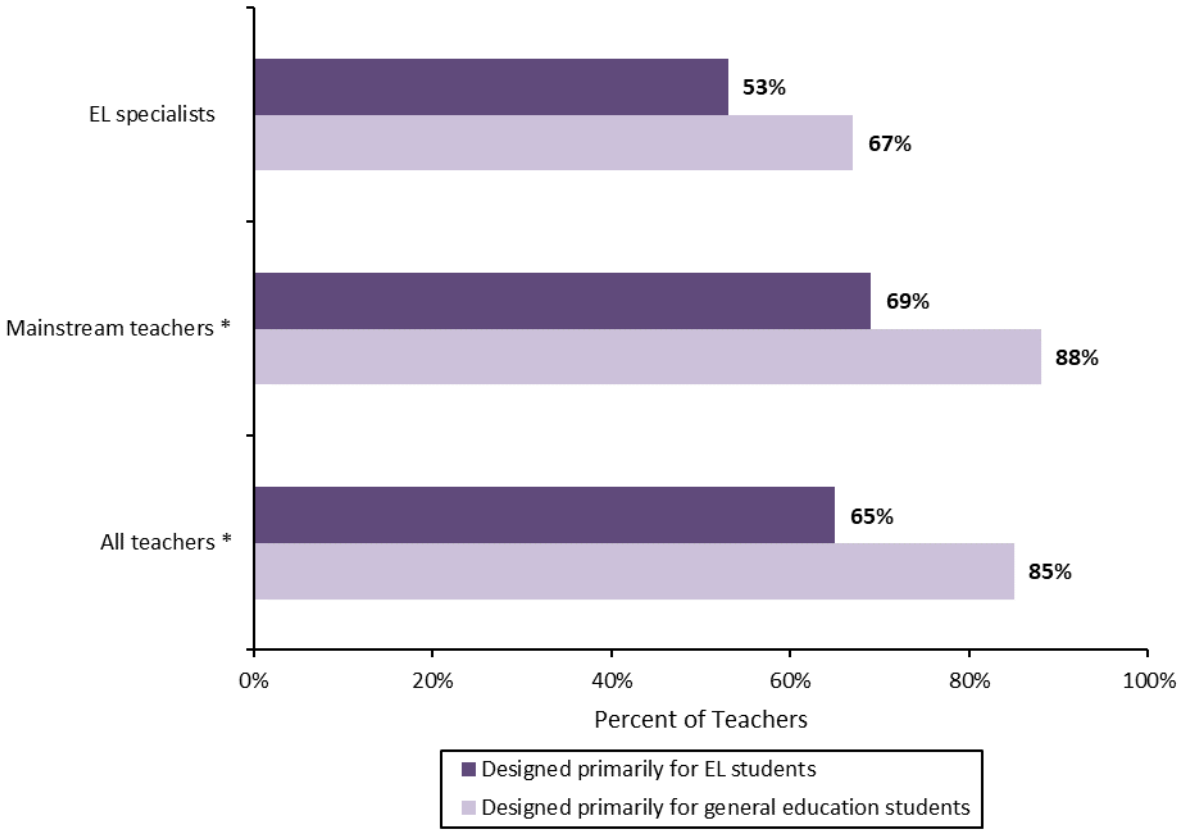

Exhibit reads: Of EL specialists who reported using DLRs in instructing EL students, 53 percent reported weekly or daily use of DLRs designed primarily for EL students, compared with 67 percent who reported use of DLRs designed primarily for general education students. This difference is not statistically significant.

* Percentage for DLRs designed primarily for EL students is statistically different from percentage for DLRs designed primarily for general education students ($p < .05$).

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.

Source: Teacher survey, item 24 (n = 359 mainstream teachers and 204 EL specialists)

Availability and Use of Digital Academic Content, Productivity, and Communication Tools

Most teachers of EL students reported having access to multiple DLR types within three broad categories of DLRs.

Of teachers who reported using DLRs in instructing EL students, 97 percent reported academic content tools were available, 90 percent reported productivity tools were available, and 84 percent reported communication tools were available[12] (Exhibit 16). There was no statistically significant difference between mainstream teachers and EL specialists in DLR availability.

Exhibit 16. Percentage of teachers reporting that various categories of DLRs were available to them

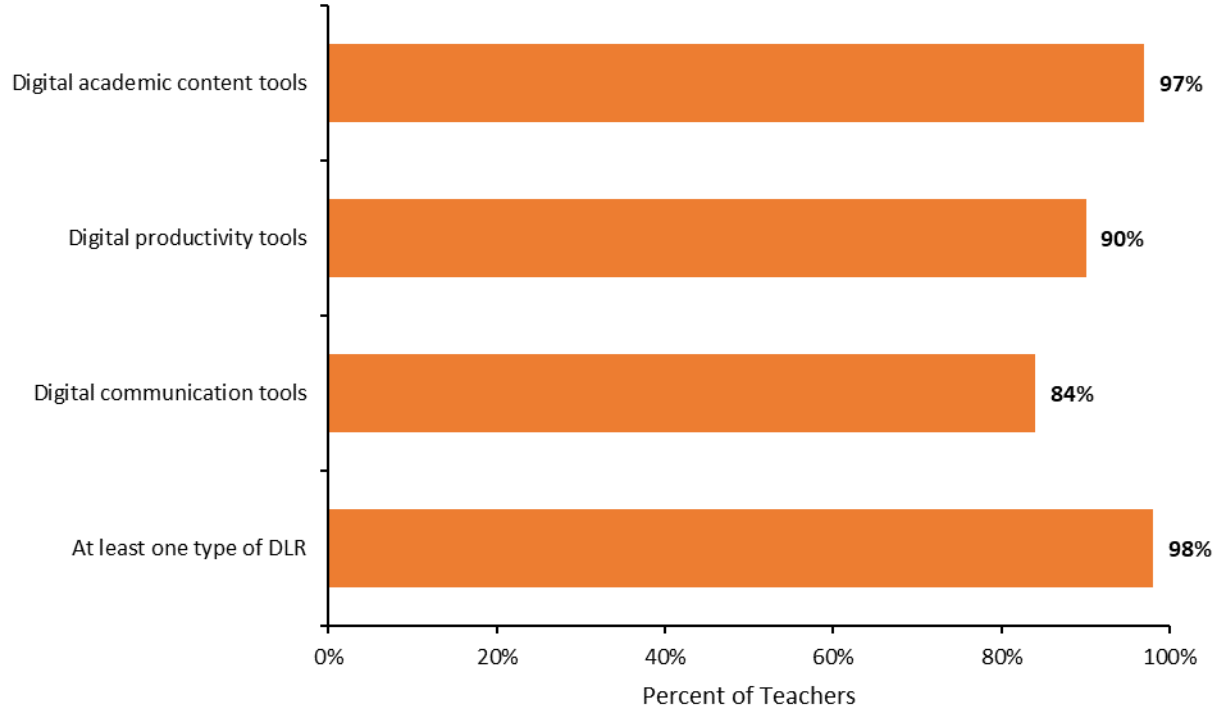

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 97 percent of teachers reported that at least one academic content tool was available to them.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, items 21 and 22 (*n* = 562 teachers).

[12]The availability of the three broad categories of DLRs (academic content, productivity, and communication) was roughly similar to the district findings. See Exhibit 11 in Chapter II for district statistics.

About two-thirds of teachers surveyed reported using digital references and resources tools, language tutorials or practice tools, presentation tools, and academic tutorials or practice tools weekly or daily in instructing their EL students.

Teachers most often reported that they used digital references and resources (82 percent), language tutorials and practice tools (81 percent), presentation tools (77 percent), and academic tutorials or practice tools (75 percent). Forty-six percent or less reported use of simulations or virtual worlds tools, spreadsheets or data analysis tools, articulation tools, blogs, chats, or journals tools, and video-conferencing DLR tools (Exhibit 17). Teachers' use of DLRs may depend not only on teachers' choices but also on DLR availability; for example, the least used tool (video conferencing, used by 13 percent of responding teachers) was also the least available, as reported by districts.[13]

Looking at teachers who reported using these tools weekly or daily, the pattern is similar to the findings for at least some use. For example, roughly half or more of teachers used the same four types of digital tools weekly or daily in instructing EL students: language tutorials or practice (65 percent), academic tutorials or practice (60 percent), reference and resources (60 percent), and presentation tools (48 percent). There were no statistically significant differences in usage between mainstream teachers and EL specialists.

Teachers in high-EL districts were more likely than those in low-EL districts to report weekly or daily use of articulation tools in instructing their EL students (47 percent vs. 14 percent) (Exhibit C-12). In the case study districts, many teachers described using slide presentation DLRs to help students understand new content. The slide presentations included various images, videos, and other materials that they pulled from reference and resource DLRs. Teachers also commented that they frequently used reference and resource tools such as visual images (photo and video) to support all students, and that this support was especially beneficial for their EL students. For example, an elementary school EL specialist in one case study site reported often using a video-sharing platform or online images to help introduce new words. A mainstream secondary school math teacher reported often using online videos to give visual representations of math concepts to help all of her students understand, including her EL students.

In the case studies, across all grade levels, teachers' descriptions of the DLRs they used showed an emphasis on language and literacy content. Mainstream teachers most often said they used tutorials or practice DLRs to help students develop their academic vocabulary, strengthen basic skills, and improve reading fluency and comprehension. Several mainstream teachers also mentioned using digital math tutorials to help students practice basic math skills, particularly at the elementary level. Also, in three of the six case study districts, elementary school teachers reported using DLRs to give students practice typing before the state standardized test, commenting that their students did not always come into school with experience in using computers or knowing how to type using a keyboard.

[13] As shown in Chapter II in Exhibit 12, video-conferencing was the type of DLR that districts were least likely to report that they provided for instructing EL students; 42 percent of districts reported providing video-conferencing tools, compared with much higher percentages that reported providing, for example, language tutorials or practice tools (91 percent) and references and resources tools (84 percent) for instructing EL students.

Exhibit 17. Percentage of teachers reporting that they used various DLRs in instructing EL students, by frequency of use

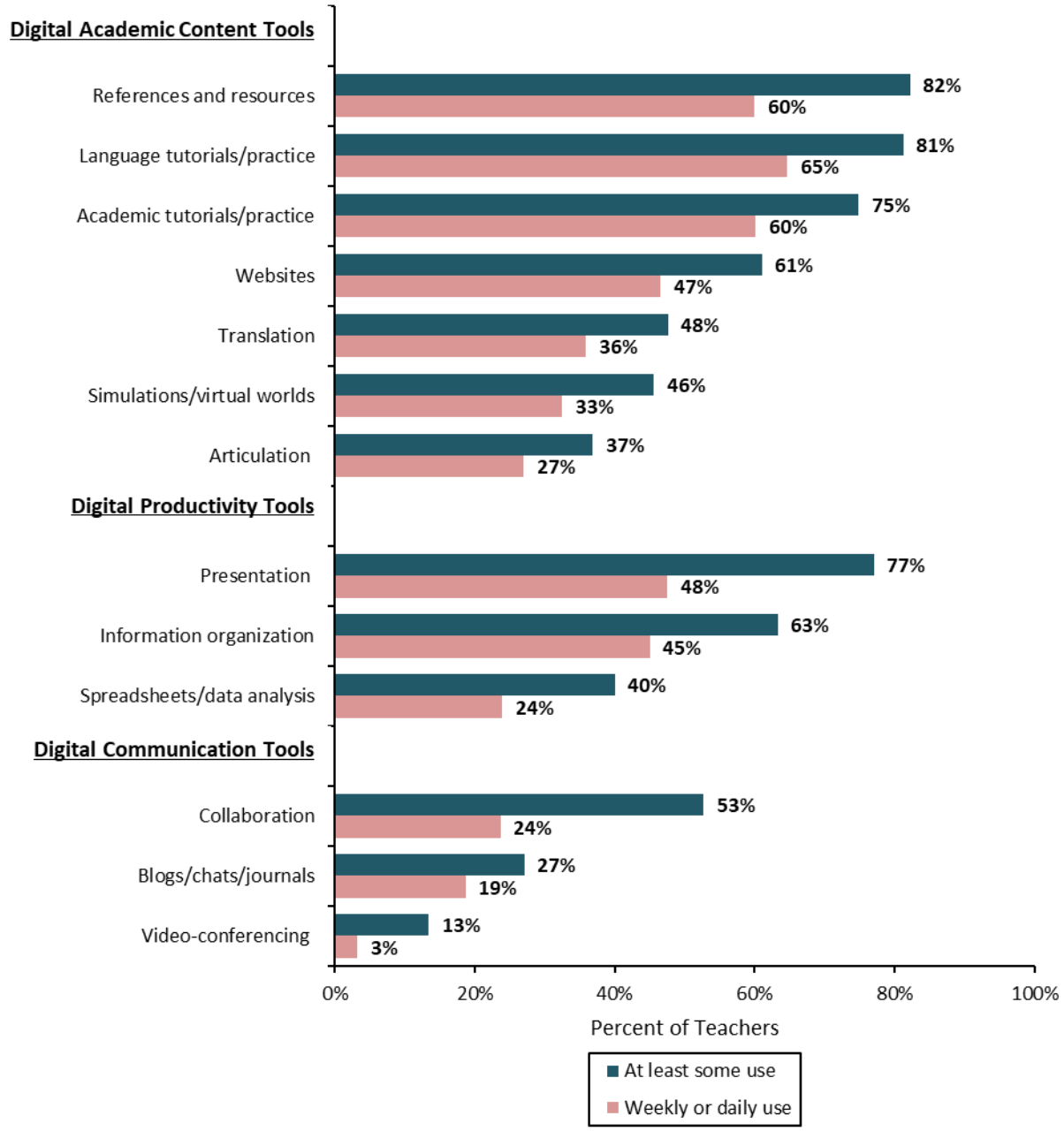

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 82 percent of teachers reported at least some use of references and resources DLRs and 60 percent reported weekly or daily use.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 23 (*n* = 575 teachers).

Contexts for EL Students' Use of DLRs

Teachers reported on the extent to which their EL students used DLRs within several different activity contexts.[14, 15] These included independent or individual work facilitated by an instructor; whole-class activity; pair or group work (either with all EL students or in a mixed pair or group of EL students and English speakers); and student use in their free time. Teachers also reported on how often they assigned DLR use outside of class and for DLR use at home with family members (Exhibit 18).

The majority of teachers reported that EL students often used DLRs when working independently (61 percent) or as part of a whole class activity (60 percent); few teachers reported assigning EL students to use DLRs outside of class (16 percent).

In case study interviews, several teachers stated that both their EL students and English-proficient students frequently worked independently at their own pace on the same DLR. This ability to differentiate activities was, in fact, one of the most valuable features of DLRs, according to respondents. As one mainstream teacher noted, DLRs allowed students to move at their own pace and to redo lessons as needed, which the EL students in her class really appreciated. However, teachers in two districts commented that EL students sometimes worked on different DLRs or one-on-one with the teacher while English-proficient students in the class worked on another activity.

A majority of mainstream teachers interviewed in the case study districts described using DLRs in whole class activities to introduce content. For example, they projected slide presentations, images, websites, or videos for the whole class. They used productivity DLRs to assess learning, such as, through apps that can create and administer interactive quizzes to students.

Considering other contexts for DLR use, fewer than one in five surveyed teachers reported that EL students were assigned work with DLRs for outside of class. Sixteen percent of teachers surveyed reported that EL students often were assigned to use a DLR to continue learning outside of class, and 10 percent of teachers reported that EL students often were assigned to work with parents or other family members at home using a DLR (Exhibit 18).

Most teachers in the case study interviews noted that they generally did not assign DLR use for students outside of the classroom given their concern that some students might not have access to computers, DLRs, or internet capacity at home. However, a small number of other case study teachers did assign DLR work for outside of class and offered examples. One teacher, who used an online flashcard app in her class, stated that a useful feature of the DLR was that students could use it on their cell phones so the EL students could quiz themselves on vocabulary, for example, while in the car. Examining survey

[14]Teachers responded to the survey question to indicate frequency of DLR use for each context. The options were: not at all, rarely, sometimes, often, and all of their work on DLRs. Based on the survey responses, some of the respondents apparently understood the last option to refer to all work in the individual context rather than all DLR work, using "all of their work on DLRs" for more than one context. This response option was seldom used; no more than 2 percent of teachers indicated it for any context. The analysis combines responses "all of their work on DLRs" and "often" responses for each context, and reports these as "often."

[15]The study did not obtain data on the proportion of time teachers used the different contexts in a typical instructional day or week.

data, about one third of surveyed teachers reported that they did not assign any DLR work outside of the class (32 percent) or specifically for work at home with family (38 percent).

Exhibit 18. Percentage of teachers reporting various activity contexts in which their EL students used DLRs often

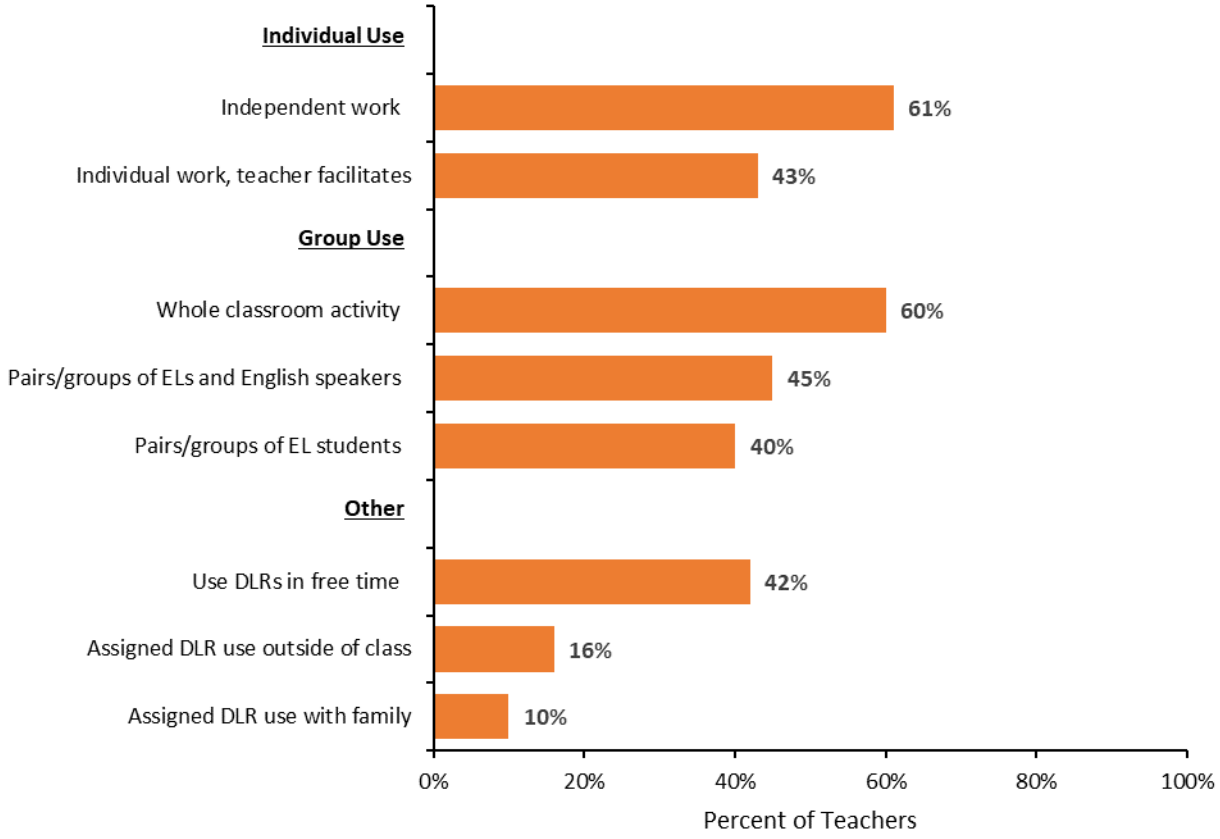

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 61 percent of teachers reported that, when EL students worked independently, they often used DLRs.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 30 (*n* = 573 teachers).

Mainstream teachers were more likely than EL specialists to report that students often worked with DLRs as part of whole-class activities (63 percent vs. 31 percent), in activities where they worked in pairs or groups of EL students and English speakers (50 percent vs. 23 percent), and in work with DLRs in pairs or groups of EL students (45 percent vs. 19 percent) (Exhibit C-13).

Measures Used to Assess the Effectiveness of DLRs in Instructing EL Students

The majority of districts reported that they used EL students' performance on English language proficiency tests (65 percent), scores on state assessments (64 percent), and EL students' progress progression on reading book levels (60 percent) to track the effectiveness of DLRs for instructing EL students (Exhibit 19). Additionally, half or more districts reported that they tracked EL student performance on district assessments (57 percent), grades on report cards (52 percent), and scores on in-class assessments (50 percent). Least commonly reported indicators were credits earned toward graduation (46 percent) and student attendance (45 percent). High-EL districts were more likely than low-EL districts (66 percent vs. 53 percent) to report using scores on district assessments as tracking tools (Exhibit C-14).

Exhibit 19. Percentage of districts reporting various indicators that they used to track the effectiveness of DLRs for EL students

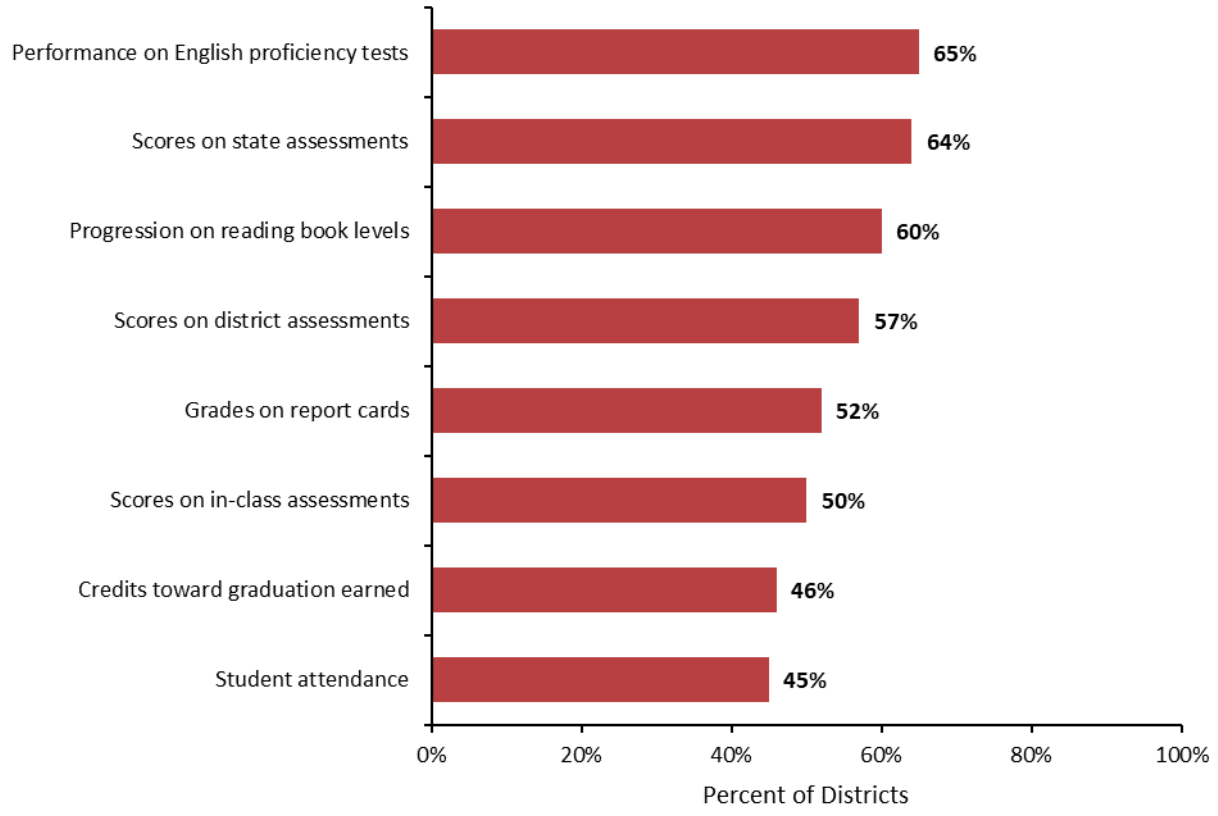

Exhibit reads: Sixty-five percent of districts reported using performance on English proficiency tests as an indicator for tracking the effectiveness of DLRs for EL students.

Source: District survey, item 20 (*n* = 694 districts).

Administrators in the case study districts reported using several informal tools, such as teacher input, to track the effectiveness of DLRs for EL students.

Most case study district and school administrators stated that they assessed the effectiveness of DLRs by collecting informal data on teacher satisfaction, student engagement, and frequency of DLR use. In one district, for example, the EL services coordinator asked teachers about their experiences in using the DLRs and collected anecdotes from teachers about how the DLRs were benefitting students. In another district, DLR subscriptions were renewed based on the frequency of the DLR use.

In a third district, the school technology coordinator reported hosting informal discussions for teachers. The coordinator used these opportunities to ask how teachers were using the DLRs in class and to obtain their perspectives on whether the DLRs were worth the district's investment. The coordinator reported that she also examined how those teachers' students performed on standardized tests in conjunction with the frequency of their DLR use.

Surveyed teachers reported using multiple approaches to judge the effectiveness of DLRs for EL students. Some of the commonly used tools were EL student scores on in-class assessments (89 percent), EL student scores on district assessments (76 percent), and EL student progress on reading book levels (72 percent) (Exhibit 20).

Exhibit 20. Percentage of teachers reporting various indicators that they used to judge the effectiveness of DLRs in supporting EL students

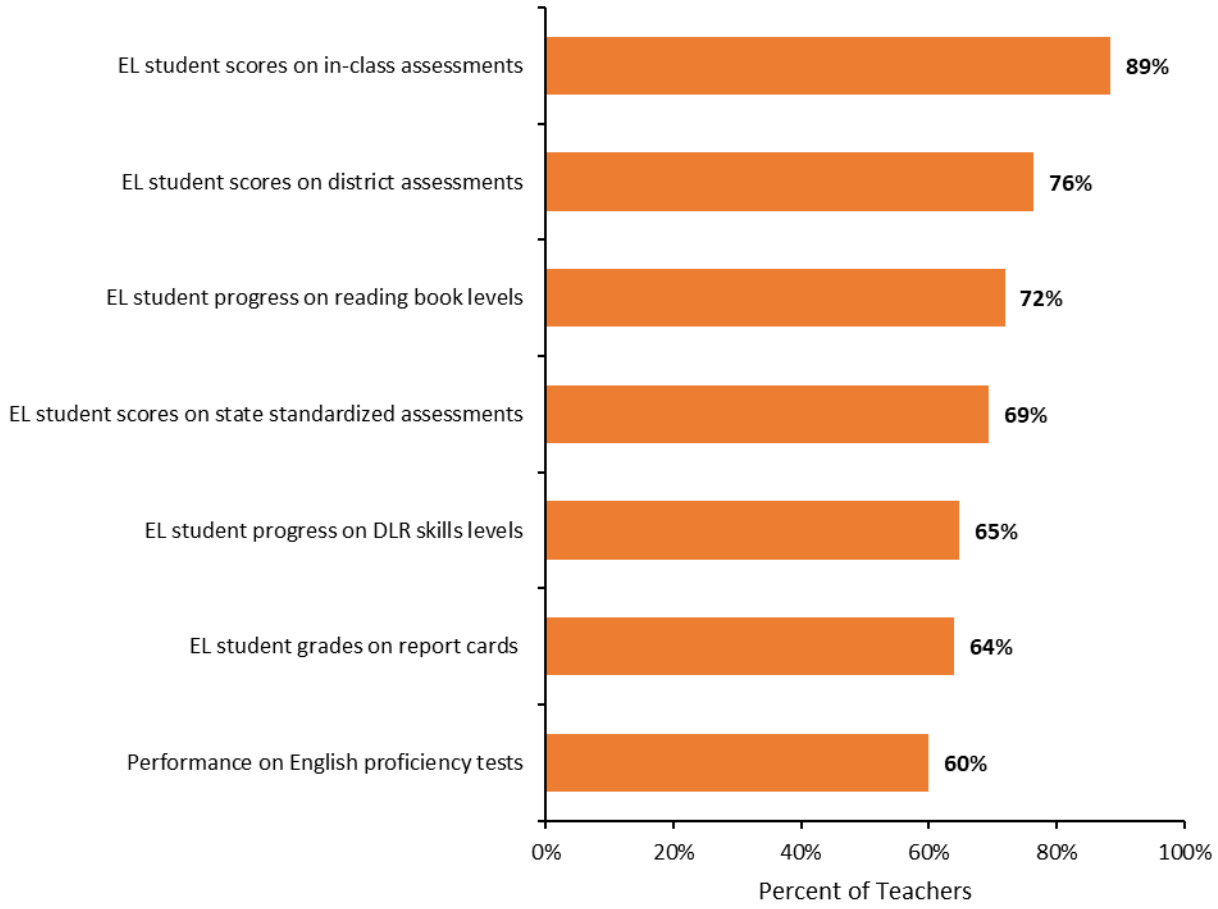

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 89 percent of teachers reported using EL student scores on in-class assessments to judge the effectiveness of DLRs in supporting EL students.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 33 (*n* = 563 teachers).

In the case study interviews, the majority of teachers commented that they considered the DLRs to be effective if they increased student engagement, were popular with students, or if they observed that their students' DLR use was correlated with academic growth. For example, two mainstream teachers noted that when they asked their students to compose essays on the computer using a DLR, the students were much more engaged and less reluctant to write. Other teachers stated that they viewed a DLR as successful if it supported students in learning the content. Similarly, an EL specialist reported that she looked for improvement in scores on the English proficiency assessment and on other state standardized tests. These findings suggest that teachers relied on their observations of students in evaluating DLRs; none mentioned that they looked for rigorous evaluation studies of the DLR.

Benefits of DLR Use Reported by Case Study Teachers

Across the case studies, teachers described how they felt their use of DLRs benefitted both themselves and their students. Many teachers across most of the case study districts reported that DLRs allowed them to more capably differentiate instruction for students. For example, one mainstream teacher noted that DLRs allowed students to move at their own pace and redo lessons as needed, which the EL students in her class really appreciated. A mainstream teacher in another district commented that she was able to assign different lessons in the DLR based on students' prior performance which allowed some students in her math class to be working on more basic skills such as counting while others could move on to addition and subtraction skills.

Many case study teachers commented that DLRs also offered them expanded ways to communicate with their students and to assist students in understanding new content. Mainstream teachers and EL specialists in several districts, for example, said that they often used online videos or images to help them introduce new words to students. They commented that these multi-media ways of communicating appeared to be very helpful for their students, especially for those EL students for whom the word or concept was new.

Finally, several mainstream teachers and EL specialists across most districts said that they felt that a benefit of using DLRs was the increased student engagement they observed. For example, one EL specialist noted that the EL students she worked with were often too shy to speak up in front of class, and so these students seemed to prefer activities that they could complete on their own or with a partner. Two other teachers commented on the benefits of gaming components in DLRs. One teacher noted that the gaming elements appeared to make the DLRs more enjoyable for students, and a mainstream teacher stated that EL students seemed to be more willing to participate in group discussions when they were using a game-based DLR in which all students had to work together to advance in the game.

Chapter IV. Supports for, and Barriers to, DLR Use in Instructing EL Students

This chapter describes the professional development and other supports related to DLR use that districts reported providing and that teachers[16] reported that they received. It also outlines the perceived barriers to DLR use in instructing EL students that districts and teachers of EL students identified in the survey responses and in case study interviews.

Professional Development and Other Supports for Use of DLRs

District-provided Professional Development and Other Supports

Almost all districts reported providing at least some type of professional development or other support for DLR use in instructing general education students, and most reported providing some such support for DLR use in instructing EL students specifically.

Ninety-eight percent of districts reported that they provided at least some form of formal professional development or some form of other support for DLR use in instructing general education students over the three-year period, school years 2014–15 to 2016–17. Formal professional development included workshops, coaching, or in-class assistance to teachers in use of DLRs; other supports included access to online professional development, funding to attend conferences, and time for planning or collaboration. Seventy-seven percent of districts reported at least some form of professional development or other support for DLR use with EL students specifically.

Considering the types of professional development or other supports provided for DLR use in general education instruction, about three-fourths of districts reported providing workshops on a specific DLR (79 percent), workshops on integration of DLRs in instruction (75 percent), and access to online or web-based professional development (72 percent) (Exhibit 21). Districts most commonly reported that providers of formal professional development on DLR use in general education were internal educational technology experts (74 percent) and general education teachers (66 percent) (Exhibit 21).

With regard to supporting DLR use specifically with EL students, fewer than one-half of districts reported providing workshops on features of a specific DLR (46 percent), access to online professional development (45 percent), and funding to attend conferences (44 percent). Internal educational technology experts (39 percent) and EL specialists (35 percent) were the most commonly reported providers of formal professional development for DLR use related to EL students specifically. About 30 percent of districts reported that district professional development administrators, DLR vendor representatives, general education teachers, and district instructional technology coaches provided professional development support (Exhibit 21).

[16] Readers should note that the teacher survey sample was not nationally representative and the results based on the teacher survey data should be interpreted with caution. See Chapter 1 and Appendix A for additional information about the teacher sample selection.

Districts were least likely to report that an external educational technology expert provided professional development in their district. This was true related both to support for DLR use in instructing general education students (29 percent) and support for DLR use with EL students specifically (16 percent).

Districts were less likely to report providing professional development and other supports for DLR use in instructing EL students specifically as compared with professional development for instructing general education students.

Districts were less likely to report offering each of the eight listed types of supports for using DLRs in instructing EL students specifically as compared with offering the supports for DLR use in instructing students in general education classes. The differences in the supports that districts reported ranged from 14 percentage points to 37 percentage points (Exhibit 21). For example, 38 percent of districts reported providing workshops on the integration of DLRs in instructing EL students specifically versus 75 percent of districts reporting such workshops for DLR use with students in general education classes. Also, 32 percent of districts reported providing direct coaching support to teachers to assist them in integrating DLR use for EL students specifically compared with 58 percent of districts reporting such coaching related to DLR use for general education students. There were similar differences in other types of supports for DLR use. As an example, 45 percent reported providing access to online sources of professional development focused on DLR use with EL students specifically, while 72 percent reported providing such support for teachers instructing general education students.

In describing the persons who provided professional development, districts were more likely to report that EL specialists provided professional development related to DLR use with EL students than for DLR use in general education. For all other types of providers listed, districts were more likely to indicate that these provided professional development related to DLR use in general education than for instructing EL students specifically.

Exhibit 21. Percentage of districts reporting that they provided various types of professional development (PD) and other supports related to DLR use and the persons providing professional development, for instructing EL students specifically and for instructing general education students

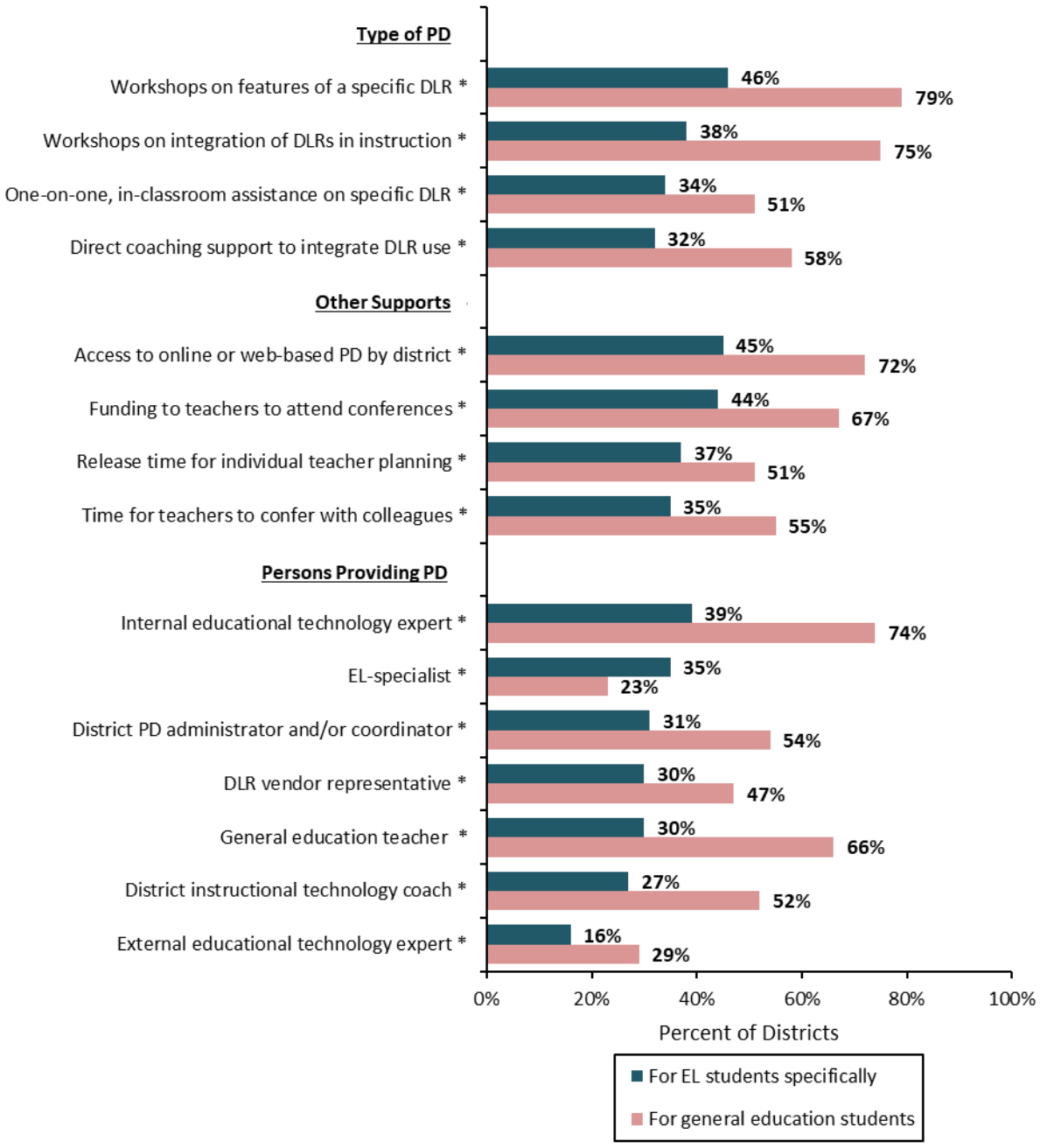

Exhibit reads: Forty-six percent of districts reported providing workshops on features of a specific DLR for instructing EL students specifically, and 79 percent of districts reported providing these for instructing general education students. This difference is statistically significant.

*Percentage for EL students is statistically different from percentage for general education students ($p < .05$).
Source: District survey, item 14 (n = 711 districts).

High-EL districts were more likely than low-EL districts to report providing professional development workshops, coaching, and in-class assistance related to DLR use in instructing EL students.

There were large and statistically significant differences for the four types of professional development listed. For example, high-EL districts were twice as likely as low-EL districts to report providing workshops related to DLR use with EL students addressing features of a specific DLR (72 percent vs. 36 percent) (Exhibit 22). There were no statistically significant differences for high-EL versus low-EL districts in other supports districts reported providing for DLR use (e.g., access to online or web-based professional development). High-EL districts were more likely to report using vendor representatives, district staff, and specialists as providers of professional development (Exhibit 22). However, external technology experts were the least commonly reported provider for both high-EL and low-EL districts (18 percent and 14 percent, respectively) (C-15).

Exhibit 22. Percentage of districts reporting that they provided professional development (PD) related to DLR use in instructing EL students specifically, and the persons providing the professional development, in high-EL and low-EL districts

Type of PD and person providing PD	Percentage of high-EL districts	Percentage of low-EL districts	Percentage-point difference
Type of PD			
Workshops on features of a specific DLR*	72	36	36
Workshops on integration of DLRs in instruction*	60	30	30
Direct coaching support to integrate DLR use*	54	24	30
One-on-one, in-classroom assistance on specific DLRs*	50	29	21
Persons Providing PD			
DLR vendor representative*	59	19	40
EL specialist*	57	25	32
District PD administrator and/or coordinator*	48	23	25
District instructional technology coach*	39	20	19
Internal education technology expert*	49	34	15
General education teacher*	40	26	14

Exhibit reads: Seventy-two percent of high-EL districts reported providing workshops on features of a specific DLR for instructing EL students, compared with 36 percent of low-EL districts, a 36 percentage-point difference. This difference is statistically significant.

* Percentage for high-EL districts is statistically different from percentage for low-EL districts ($p < .05$).
Source: District survey, item 14 (n = 253 high-EL and 210 low-EL districts).

Teacher-reported Receipt of Professional Development and Other Supports for DLR Use

Overall, about two-thirds of teachers surveyed reported that they received 10 or fewer hours of formal professional development related to DLRs over a three-year period.

About half of teachers (49 percent) reported receiving one to 10 hours of professional development, and 15 percent reported no hours, over three school years, 2014–15 to 2016–17. About one-quarter of teachers reported more than 25 hours of professional development over the three-year period (Exhibit 23).

Exhibit 23. Percentage of teachers reporting the hours of formal professional development on DLRs that they received over a three-year period from 2014–15 to 2016–17

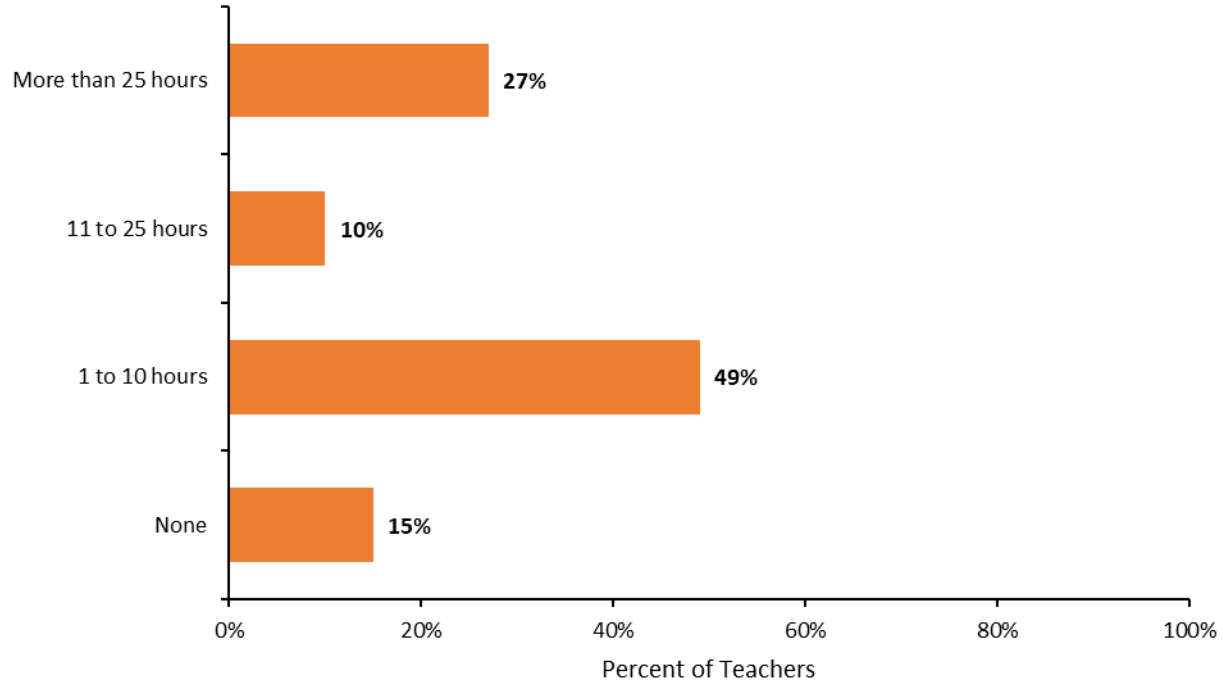

Exhibit reads: Twenty-seven percent of teachers reported more than 25 hours of formal professional development related to the use of DLRs from their school or district over a period of three years, 2014–15 to 2016–17.

Source: Teacher survey, item 34 (*n* = 682 teachers).

Across all districts, EL specialists reported fewer hours of professional development in DLR use than did mainstream teachers.

EL specialists (72 percent) were more likely than mainstream teachers (47 percent) to report one to 10 hours of professional development related to DLRs over school years 2014–15 to 2016–17. The two subgroups were almost equally likely to report receiving no hours of professional development related to DLRs (13 percent and 12 percent). Combining these findings, EL specialists (84 percent) as compared with mainstream teachers (60 percent) were more likely to report 10 or fewer hours of professional

development on DLRs over the three-year period. At the upper range of hours reported, mainstream teachers (31 percent) were more likely than EL specialists (7 percent) to report receiving more than 25 hours of professional development[17] (Exhibit 24).

Exhibit 24. Percentage of teachers reporting the number of hours of formal professional development on DLRs that they received over a three-year period from 2014–15 to 2016–17, by type of teacher

Hours	Percentage of mainstream teachers	Percentage of EL specialists	Percentage point difference
More than 25 hours*	31	7	24
11 to 25 hours	9	9	0
1 to 10 hours*	47	72	-25
None	13	12	1

Exhibit reads: Thirty-one percent of mainstream teachers of EL students reported that they received more than 25 hours of formal professional development related to the use of DLRs over a three-year period from 2014–15 to 2016–17 compared with 7 percent of EL specialists, a difference of 24 percentage points. This difference is statistically significant.

* Percentage for mainstream teachers is statistically different from percentage for EL specialists ($p < .05$).
Source: Teacher survey, item 34 (n = 438 mainstream teachers and 227 EL specialists).

In the case study districts, only a few EL specialists and mainstream teachers of EL students reported participating in professional development on the use of DLRs specifically for instructing EL students. In fact, across all districts in the case studies, most mainstream teachers interviewed said that they would like to learn about using DLRs in instructing their EL students.

Teachers most commonly reported receiving professional development in the form of workshops on integrating DLRs in instruction (71 percent), workshops on how to use the features of a specific DLR (70 percent) and coaching on integrating DLRs in instruction (69 percent). Teachers also reported receiving other district-provided supports that enabled them to learn about and work with DLRs on their own. About half of teachers indicated use of release time for planning DLR use, online modules provided by the district, and time allocated for collaboration with other teachers (from 47 to 55 percent) (Exhibit 25).

About half of teachers surveyed reported receiving professional development specific to using DLRs with EL students.

Between 44 and 51 percent of surveyed teachers reported receiving workshops, coaching, and scheduled consultations with an ESL or other EL specialist teacher on use of DLRs for instructing EL students specifically (Exhibit 25). There were no statistically significant differences between mainstream teachers and EL specialists for any of the types of professional development listed.

[17]There was substantial variation in the amount of professional development that mainstream teachers received, with 60 percent receiving 10 hours or fewer of professional development, while 31 percent received more than 25 hours. In part, the number of hours of professional development was related to teachers' level of experience, with the less experienced teachers receiving more professional development: Mainstream teachers who received 26 or more hours of professional development had a mean of 6.6 years of teaching at the K–12 level, while mainstream teachers who received 25 or fewer hours of professional development had a mean of 12.2 years.

In the case study districts, some teachers of EL students described the professional development they received as in their view more typically focused on how to use specific features or functions of individual DLRs rather than on how to incorporate the use of the DLRs into their instruction. For example, the teachers commented that the professional development focused on specifics such as how to set up student accounts, how students should log in, or how students could access audio features to listen to an unfamiliar word. As one mainstream teacher stated:

> *"… [I learned]…just the workings of the system. There was not a specific training about how are you going to use this for your instruction."*

The type of training or professional development that teachers indicated they felt would be most helpful was guidance grounded in actual instructional practice. For example, one teacher described her experience with a professional development training that she viewed as very useful for her as follows:

> *"It was presented from an educator standpoint, not from a digital resource standpoint. …the two days' training was actually put on by teachers who actually teach in the classroom… so it was put on by the educators themselves. And so it was very good to see… [that] it wasn't them just teaching you how to use the software. It was teaching you how to integrate it into what you're already doing as an educator."*

Exhibit 25. Percentage of teachers reporting that they received various types of formal professional development (PD) on DLR use in general and on DLR use specific to EL students over a three-year period from 2014–15 to 2016–17

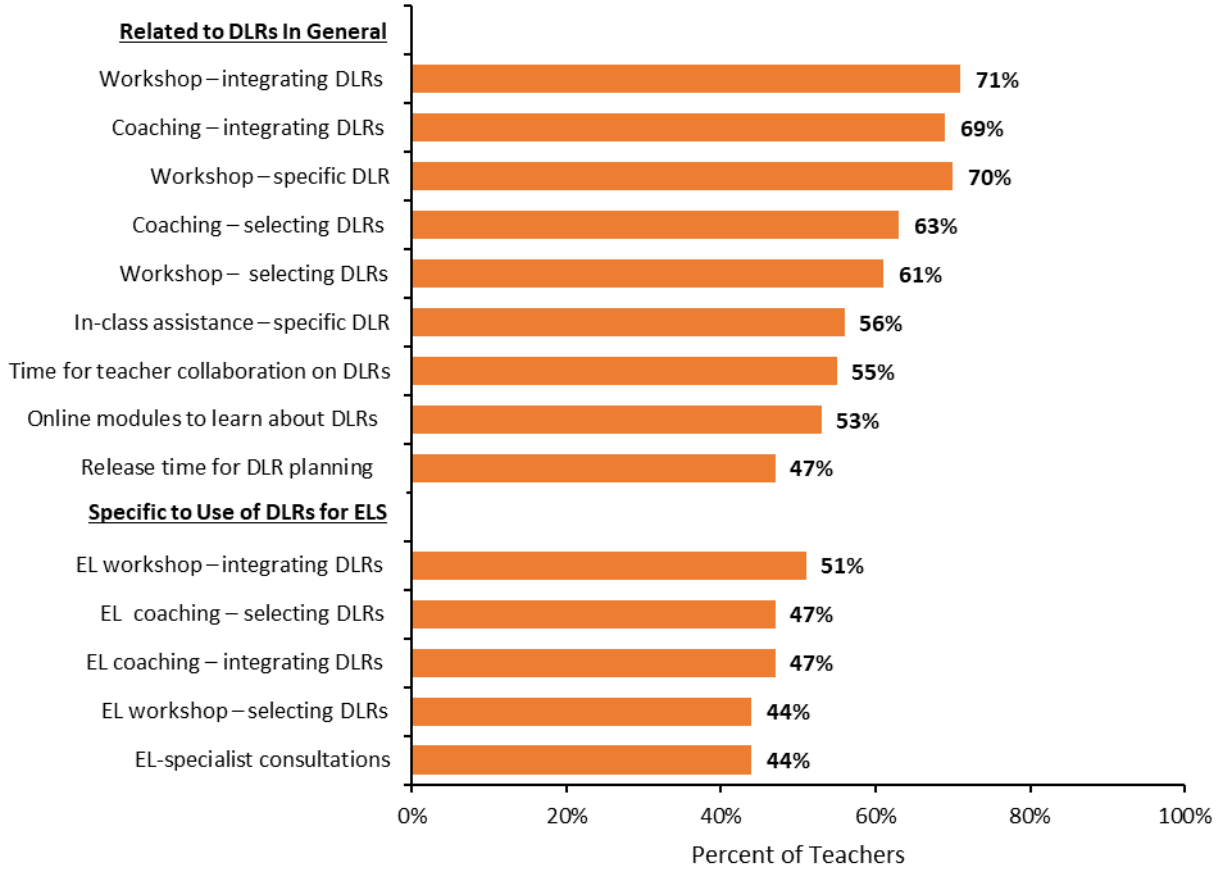

Exhibit reads: Seventy-one percent of teachers reported receiving formal professional development related to DLR use in general through workshops on integrating DLRs into instruction over a three-year period, from 2014–15 to 2016–17.

Source: Teacher survey, item 35 (*n* = 682 teachers).

Teachers in high-EL districts were more likely than teachers in low-EL districts to report receiving professional development workshops related to use of DLRs in general.

Teachers in high-EL districts were more likely than teachers in low-EL districts to report receiving workshops on DLR use on integrating DLRs into the classroom (79 percent vs. 43 percent) and workshops on using features of specific DLRs (78 percent vs. 42 percent) (Exhibit C-16).

Teachers also reported on the helpfulness of the formal professional development and other supports they received in the past three school years. In order to make teachers' responses comparable across the various supports, only teachers who received a support are included in the calculations for that support.[18]

One-third or more of teachers reported that they felt that individual release time for planning related to the use of DLRs, workshops on integrating DLRs into instruction in general, and joint time allocated for teachers to discuss the use of DLRs were extremely helpful to their use of DLRs in instructing EL students.

Between 27 and 31 percent of teachers considered other forms of professional development as extremely helpful. For example, these included in-class assistance and coaching on integrating DLRs in general and for EL students specifically. Slightly less than one quarter (24 percent) of teachers indicated that they felt that online modules and workshops on working with specific DLRs were extremely helpful, and 16 percent considered consultations with EL specialists as extremely helpful to their use of DLRs with their EL students.

However, examining combined responses (extremely helpful and moderately helpful), the findings provide a different perspective on how teachers viewed support through their consultations with EL specialists. Among professional development and supports that teachers considered either extremely helpful or moderately helpful, two highly appreciated types were workshops on selecting DLRs for the general classroom (79 percent of teachers) and consultations with EL specialists (77 percent). Also, nearly three-fourths of teachers considered other types of professional development extremely or moderately helpful: workshops on working with a specific DLR (72 percent); workshops on integrating DLRs into instruction in general (71 percent); coaching on integrating DLRs for ELs (71 percent); and coaching on selecting DLRs for EL students (71 percent) (Exhibit 26).

[18]Only teachers who received a support were included in the statistics for that support. The exclusion of teachers who did not receive the supports reduces the number of teachers substantially, often by about half, making comparisons across subgroups of teachers inappropriate.

Exhibit 26. Percentage of teachers reporting that they viewed various types of formal professional development they received as extremely helpful or moderately helpful to their use of DLRs with EL students

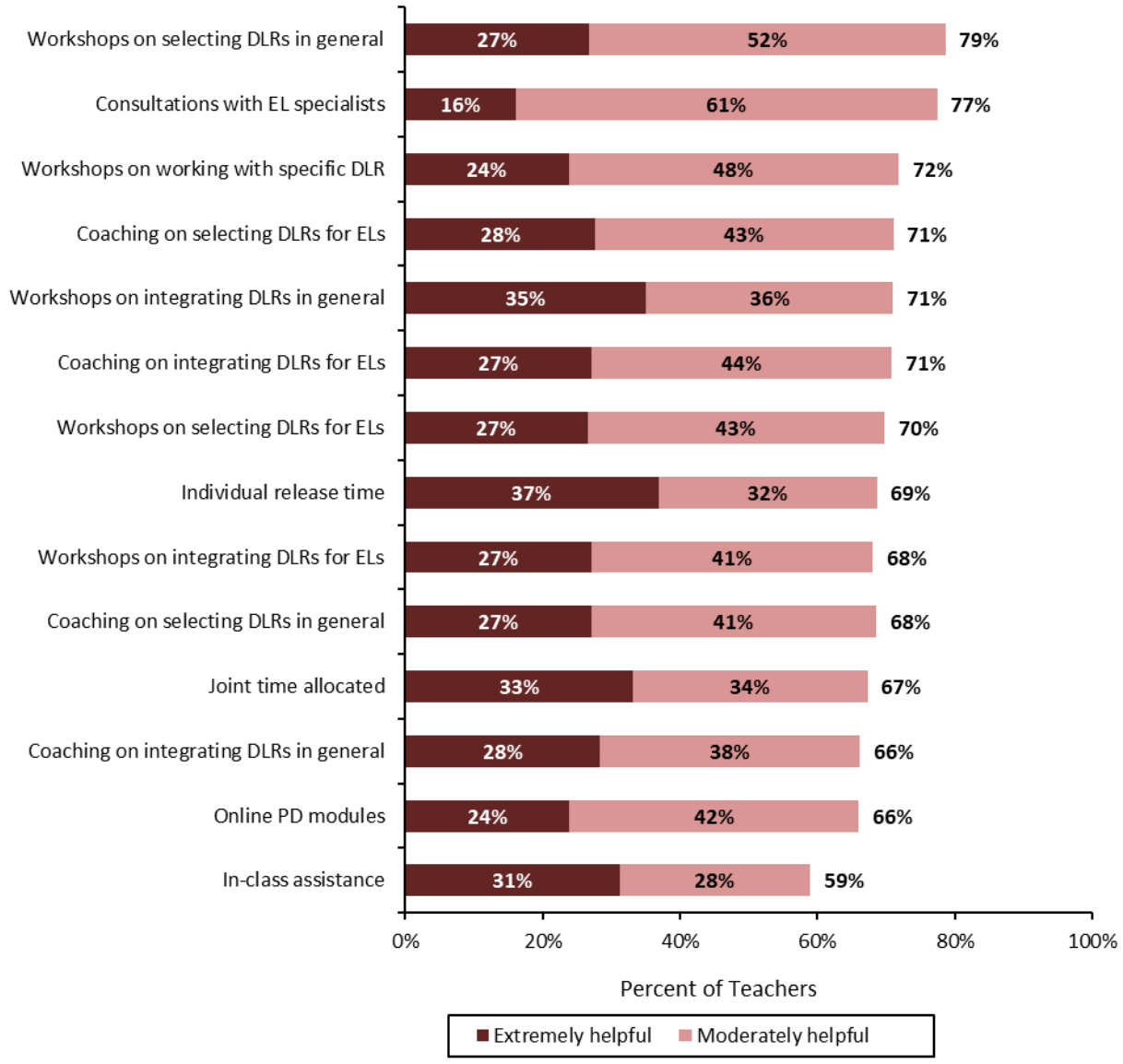

Exhibit reads: Thirty-seven percent of teachers who received individual release time for planning related to using DLRs reported that in their view it was extremely helpful to their use of DLRs with EL students, and 32 percent reported that they felt it was moderately helpful, for a total of 69 percent of teachers.

Notes: Teachers who did not receive a particular type of support are excluded from the calculations. Only teachers who received a support were included in the statistics for that support. The exclusion of teachers who did not receive the supports reduces the number of teachers substantially, often by about half, making comparisons across subgroups of teachers inappropriate.

Source: Teacher survey, item 35 (*n* = 682 teachers).

Receipt of Informal Professional Development Related to Use of DLRs

Three-fourths or more of teachers reported receiving informal professional development through collaboration with other teachers or through using collaborative online sites.

Teachers reported that they collaborated through group discussions with other teachers (82 percent), informal collaboration or mentoring with another teacher (80 percent), and reported learning about DLR use independently through online professional communities, discussion boards, and other collaborative sites (76 percent) (Exhibit 27). A majority of teachers (61 percent) also reported learning about DLRs through online searchable DLR collection sites. In searchable DLR online sites, users can apply key terms to identify DLRs and can obtain reviews or user comments on specific DLRs. About half of teachers (53 percent) reported consulting with an EL specialist. Teachers' responses were similar for both mainstream teachers and EL specialists.

Most mainstream teachers and EL specialists in case study districts reported that they valued opportunities to collaborate with peers around DLR use, such as through hallway conversations, grade-level team meetings, or email. Several teachers from across all districts also reported using online resources to learn about DLRs, but the teachers did not refer to using searchable DLR collections.

Most EL specialists in the case study districts described supporting mainstream teachers. For example, one EL specialist commented that the teachers knew to come to her for resources on DLRs and for ideas on instruction. She described her role as guiding mainstream teachers on how to use a new DLR geared toward EL students and suggesting activities within a DLR to help the students learn specific skills. Another EL specialist mentioned that she would suggest specific DLRs for mainstream teachers to use with their EL students.

Exhibit 27. Percentage of teachers reporting that they received various types of informal professional development over a three-year period from 2014–15 to 2016–17

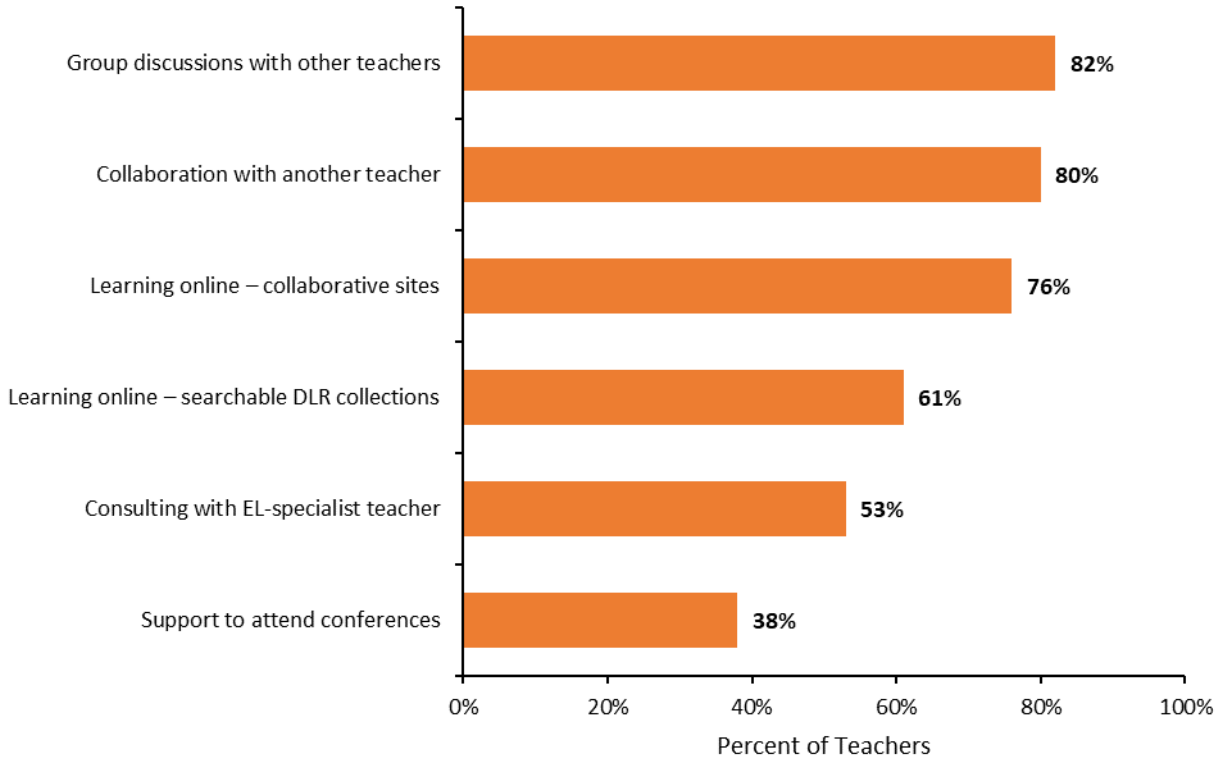

Exhibit reads: Eighty-two percent of teachers reported that they received informal professional development related to the use of DLRs in instruction in the form of group discussions with other teachers over a three-year period from 2014–15 to 2016–17.

Source: Teacher survey, item 36 (*n* = 684 teachers).

In some case study districts, teachers reported that they received support for DLR use from other teachers whom they viewed as technology leaders, that is, teachers who were early adopters of DLRs, strong users of technology, and who were willing to share their knowledge.

Some case study teachers noted that when they received guidance from technology leaders they not only learned how to use the specific DLR, they also received useful information on how to incorporate its use into their instruction. For example, one mainstream teacher reported that she learned a strategy for using the audio feature in her presentation software as a way to scaffold vocabulary development for her students.

The case study interviews highlighted that much of the guidance offered by teachers viewed as technology leaders was often quite informal. One mainstream teacher noted that she felt fortunate that she had somebody to ask for help who was right down her hallway, commenting:

> *"I mean I'm lucky in that her classroom is located across the hall from mine, so I communicate with her. Whenever I have a question, she's always there to talk to us about different resources and different things to do. It's all completely informal, though. It's like in the hallway, in the passing time. We do not have time set aside. We just do it on a daily basis informally."*

Most surveyed teachers reported that they felt collaboration with another teacher (84 percent), group discussion with other teachers (78 percent), and informal consulting with an EL specialist (72 percent) were helpful to their use of DLRs with EL students.

Also, more than half of teachers reported that in their view other informal supports were helpful (either extremely helpful or moderately helpful). These were support to attend a conference (69 percent); learning online through collaborative sites (64 percent); and learning online through searchable DLR collections (54 percent) (Exhibit 28).[19]

[19]Only teachers who received a support were included in the statistics for that support. The exclusion of teachers who did not receive the supports reduces the number of teachers substantially often by about half, making comparisons across subgroups of teachers inappropriate.

Exhibit 28. Percentage of teachers reporting that they viewed various types of informal professional development they received as extremely helpful or moderately helpful to their use of DLRS with EL students

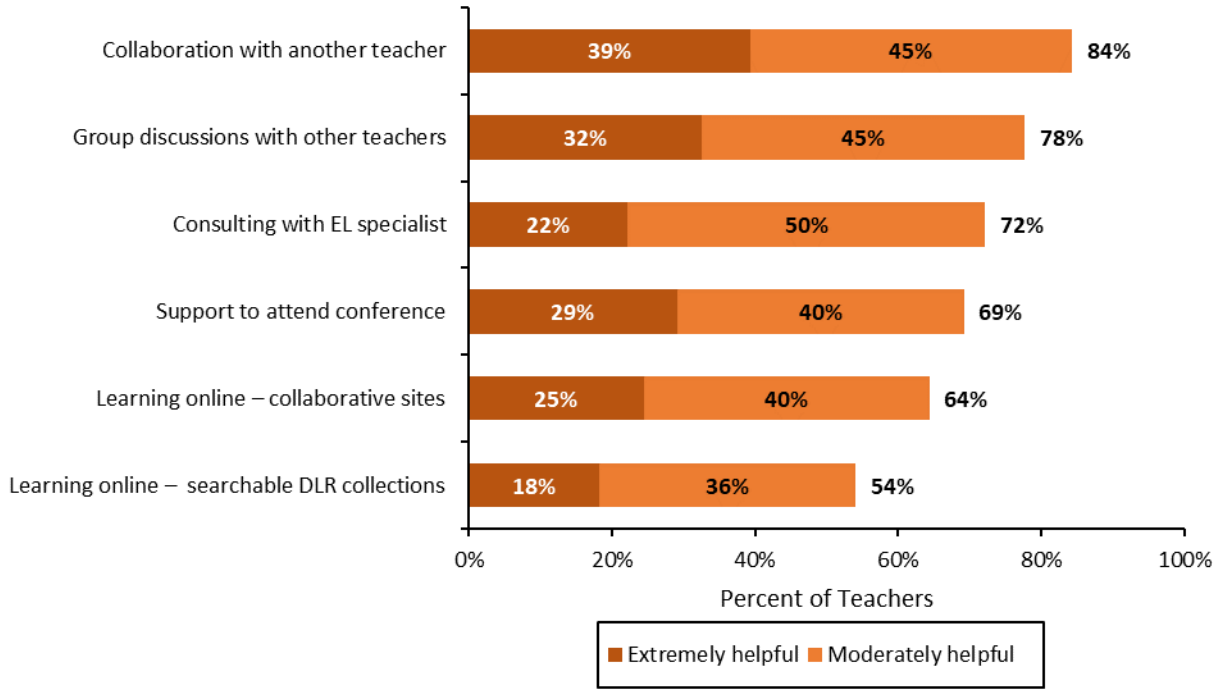

Exhibit reads: Thirty-nine percent of teachers of EL students reported that in their view informal collaboration with another teacher was extremely helpful for their use of DLRs with EL students, and 45 percent reported that they felt it was moderately helpful, for a total of 84 percent.

Notes: Teachers who did not receive a particular type of support are excluded from the calculations. The total of the percentage reporting "extremely helpful" and percentage reporting "moderately helpful" may differ from the details shown, due to rounding.
Source: Teacher survey, item 36 (*n* = 684 teachers).

Barriers to DLR Use

Barriers Reported by Districts

Districts most commonly reported that barriers to DLR use were students' lack of home access to DLRs, teachers' need for expertise in instructing EL students, teachers' level of technology skills, and a lack of knowledge of DLRs appropriate to EL students.

Eighty percent or more of districts considered students' lack of home access, teachers' need for instructional expertise related to EL-students, teachers, technology skills, and lack of knowledge about DLRs for EL students as barriers to some extent or to a large extent. In addition, about three-quarters of districts indicated that they viewed insufficient funds to purchase DLRs (75 percent), lack of knowledge of the range of DLRs (73 percent), and lack of funds for providing teachers with professional development on integration of DLRs (70 percent) as barriers to some extent or to a large extent. Factors less commonly noted as barriers were insufficient technical support to troubleshoot hardware and software issues (43 percent) and insufficient network speed and reliability (39 percent) (Exhibit 29).

Respondents in all case study districts noted barriers related to access, including lack of a sufficient number of computers for individual students (i.e., lack of one-to-one computers) and barriers due to the cost of DLRs and related hardware. Beyond hardware issues, case study teachers commented that barriers included lack of knowledge of and familiarity with using DLRs to support EL students and students in general. Also, school and district administrators in all six districts mentioned lack of training and professional development for teachers as a barrier. While administrators recognized that teachers needed more assistance in learning how to incorporate DLRs in instruction and training to help them become comfortable with using technology, several administrators acknowledged that their school or district was limited in what it could provide. For example, administrators reported that budget constraints affected their ability to provide professional development and technology. Competing priorities for limited professional training days also posed a challenge for administrators to provide training on DLRs.

In general, high-EL districts and low-EL districts indicated similar barriers to DLR use for EL students. However, there were two exceptions. High-EL districts were more likely than low-EL districts to report that students' lack of home access to DLRs was a barrier to some extent or a large extent (92 percent vs. 82 percent) and more likely to report that teachers' level of technology skills was a barrier (91 percent vs. 79 percent) (Exhibit C-17).

Exhibit 29. Percentage of districts reporting various barriers to DLR use in instructing EL students, to a large extent or to some extent

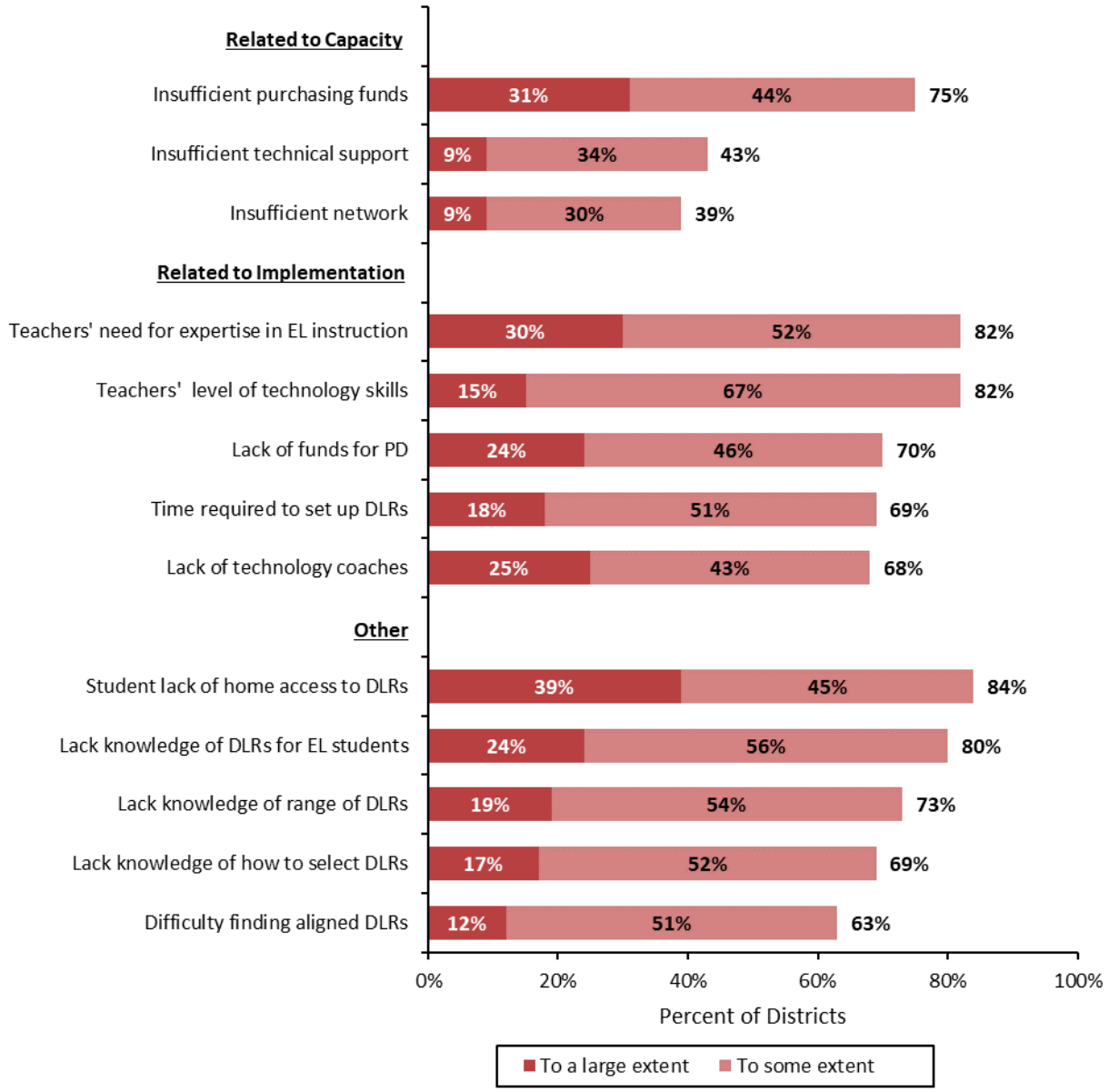

Exhibit reads: Thirty-one percent of districts reported that insufficient funds for purchasing DLRs was a barrier to a large extent for use of DLRs with EL students, and 44 percent reported it was a barrier to some extent, for a total of 75 percent of districts.

Source: District survey, item 15 (*n* = 725 districts).

Barriers Reported by Teachers

Most teachers (68 percent to 80 percent) considered the time required to work with DLRs — to find, learn, and set up for DLRs — as a barrier to their DLR use to some extent or to a large extent. In addition, a majority of teachers reported barriers related to lack of professional development on how to use specific DLRs (63 percent) and lack of in-class support on using DLRs for instruction (58 percent). However, most teachers felt supported in DLR use by their principals, with 19 percent of teachers indicating that lack of their principal's support for use of DLRs was a barrier to their DLR use in instructing EL students (Exhibit 30).

Most teachers considered students' lack of internet access at home as a barrier to some extent or to a large extent to DLR use in instructing EL students.

About four out of five teachers indicated that students' lack of internet capacity at home and lack of home access in ways other than related to internet capacity (e.g., lack of computers in the home) were barriers to some extent or to a large extent (78 percent and 79 percent). Students' lack of DLR access at home was commonly mentioned as a barrier by educators in the case study districts. Some teachers explained that they did not assign homework that would require students to use DLRs at home because they believed that several students were in homes without DLR access.

About two-thirds of teachers indicated other factors as barriers to some extent or to a large extent, including costs of DLRs, lack of knowledge of available DLRs and how to choose among them, lack of professional development on how to use specific DLRs, and difficulty in finding DLRs appropriate to their students' needs.

Fewer teachers indicated that the internet capacity available for instruction presented a barrier to their DLR use. About a third of teachers considered insufficient reliability of access to the internet (35 percent) and insufficient internet capacity (33 percent) as barriers. One in four teachers (25 percent) reported that the policy in their school or district related to DLR use was a barrier.

There were few differences by teacher subgroups in their reported barriers to DLR use in instructing EL students. First-year teachers were more likely than more experienced teachers (90 percent vs. 62 percent) to report that a lack of professional development on using specific DLRs was a barrier to their use of DLRs for instructing EL students (Exhibit C-18). Teachers in low-EL districts were more likely than those in high-EL districts to report that the time needed to find DLRs was a barrier to some extent or a large extent (88 percent vs. 50 percent) (Exhibit C-19).

Exhibit 30. Percentage of teachers reporting various barriers to DLR use in instructing EL students, to a large extent or to some extent

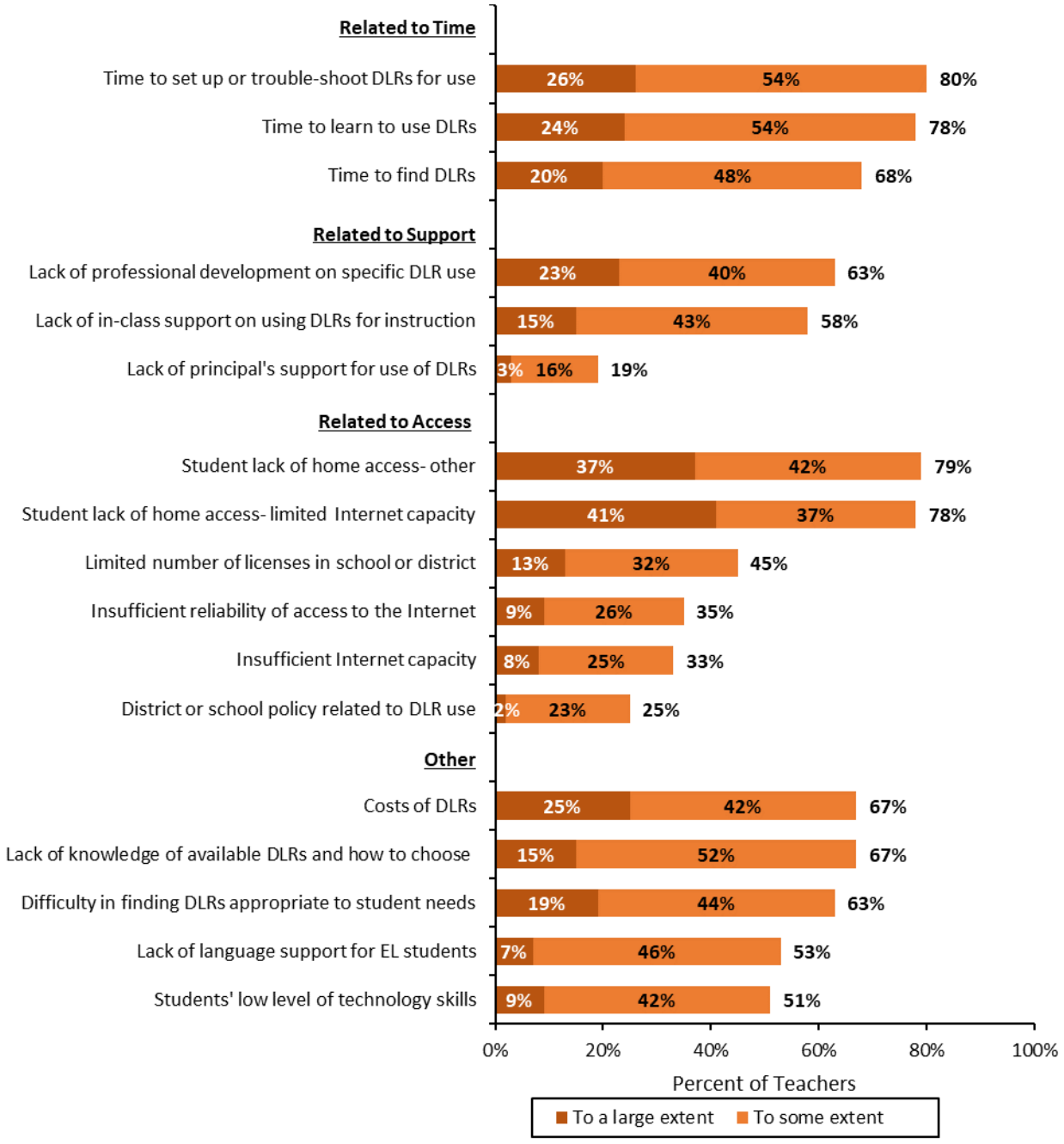

Exhibit reads: Of teachers who reported using DLRs in instructing EL students, 26 percent of teachers reported that time to set up or trouble-shoot DLRs for use was a barrier to a large extent to DLR use in instructing EL students, and 54 percent reported that it was a barrier to some extent, for a total of 80 percent.

Notes: Only those teachers who indicated in an earlier item that they used DLRs in instructing EL students responded to this item.
Source: Teacher survey, item 31 (*n* = 222 teachers).

Most case study teachers cited a number of barriers to their DLR use. They pointed to the lack of sufficient technology equipment such as computers or other hardware at school, and the lack of funding for equipment, as barriers. In addition to limited opportunities to use equipment, teachers reported that it was difficult for students to become familiar with the equipment when it must be shared by several teachers.

At least some teachers in all six case study districts described the challenges in gaining access to hardware, for example, sharing laptops or tablet carts in a system that requires advance sign-up. As an extreme example, one teacher reported that as many as 13 teachers shared the same equipment. Other barriers mentioned by case study teachers were technical difficulties such as difficulty in accessing the internet and inconsistent connectivity.

Case study teachers also commented that they felt certain content and design characteristics of DLRs posed barriers for their EL students. Many teachers cited the level of language and content in DLRs designed for general education use as too complex for their EL students. Teachers in all but one case study district explained that the vocabulary used in the DLR could be too complex for EL students, and especially for newcomers. One teacher noted the example of a DLR with a 'beginner' word list that included the word "astronaut," which she found inappropriate as a beginning vocabulary word for her EL students.

In addition, some case study teachers pointed out that EL students sometimes faced barriers in moving within and between pages and items in a DLR, and that the steps and buttons required to access support features could introduce additional complexity for them. For example, one teacher described a DLR that included an embedded audio support for students to hear the text read aloud. The DLR required students to click on a specific button to hear the word. The teacher commented that students had to navigate down to a word, then back up to the button, and then back to the word again, repeating these steps many times. The teacher observed that the navigation seemed to become a task in itself for the students. It caused her to wonder whether the students were able to concentrate on the words as they did this.

Another teacher similarly expressed frustration that the navigation in some DLRs was so hard for students that it distracted them from their work and posed additional challenges for students who might already struggle to complete tasks. As an example, she observed that when her students have to move back and forth within a DLR for an activity, they have often found themselves accidentally navigating out of the page they need. Finally, other teachers also mentioned that the different logins and passwords required for DLRs became confusing for students.

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Chapter V. Districts' and Teachers' Recommendations to Improve the Usefulness of DLRs for Instructing EL Students

Districts and teachers[20] provided suggestions on how the use of DLRs could be improved to better support EL students in learning language and content. Approximately 43 percent of districts and 52 percent of teachers provided one or more comments to express their views in response to an open-ended survey item, and case study teachers also offered suggestions for improvements. The recommendations offered in these comments addressed four themes: DLR content, features of DLRs to support EL students, features related to implementation, and professional development.

Recommendations Related to DLR Content

Provide more DLRs that engage EL students in working with core academic content while supporting students in learning language and literacy.

Many study participants requested that educational technology developers provide DLRs that incorporate support for learning language and literacy — and especially support for learning academic language — within the context of core academic content. Districts in particular focused on the need for EL students to work with DLRs that engaged them in the content they needed to learn. Comments included:

> *"There is a need for more programs which integrate content (concepts from social studies, science, etc.) and language. I'd like to see content presented with simple language and visuals until language skills develop. Most are focused on just literacy skills alone - I'd like to see more resources to practice academic language."*

> *"For effective language development instruction, students truly need authentic practice in using the new language in academic situations. It would be great if DLRs provided students with opportunities to engage with complex text while being provided the language learning support. Programs currently available do one or the other, yet are limited in being able to provide both. Remediation of reading selections and isolated language skill building seem to be the trends. For ELs, the focus on academic language and language development must go hand-in-hand."*

Provide DLRs with grade-level academic content appropriate to the needs of older EL students and especially of newcomer students in the middle and high school grade levels.

Several districts and teachers also requested that developers design DLRs that meet the needs of older newcomer EL students in learning academic content. They noted that although newcomer students

[20] Readers should note that the teacher survey sample was not nationally representative and the results based on the teacher survey data should be interpreted with caution. See Chapter 1 and Appendix A for additional information about the teacher sample selection.

often are beginners in learning English, they still need to meet academic content standards for middle or high school grade levels. In their view, the existing DLRs often do not fit the needs of such newcomers:

> *"Too many programs have content for young kids rather than middle school to high school. This 'elementary' type resource is embarrassing as a newcomer student."*

Design DLR resources to include multiple languages of EL students, broadening the range of languages usually available.

Study participants noted that they would like to see a wider range of languages included in the DLR resources (e.g., e-books or texts in students' home languages) than are currently available. Several noted that DLRs need to be responsive to the wide range of EL-student language groups that many districts serve. For example, one respondent noted that she has a difficult time finding resources in languages such as Urdu, Hindi, and Punjabi.

Provide a focus on language and literacy development for EL students that includes all four domains of language: listening, speaking, reading, and writing.

Respondents noted that DLRs should address all four language domains. In making this recommendation, some separately highlighted a need for DLRs to focus on writing. Others urged greater emphasis on promoting oral language development.

Structure the DLR so that the content is adaptive or individualized for the EL students.

District personnel were especially interested in adaptive or individualized content. However, many districts and teachers requested design of DLRs to help in tailoring instruction to the individual needs of EL students. These included requests for:

- DLRs that are adaptive in presenting content to students, i.e., adjusting the content to meet the individual student's level and progressing to new content according to the student's performance; and
- DLRs that provide resources for individualizing content, such as offering different levels of text complexity for the same content.

Provide DLRs that promote active student collaboration in activities focused on academic content.

Study respondents recommended that DLRs promote EL student collaboration and cooperation with other students. Some noted the value of DLR features that enable students to share and view each other's work. Others commented on the need for interactive activities to promote EL students' use of language about academic content with other students. These could include activities with a game element to engage students, sometimes drawing in students who might not participate in other contexts. A district administrator recommended:

> *The technology would have to be very interactive in order for the students to actively engage and participate with other students… They [EL students] need more interaction*

with other students and high level or reading/vocabulary resources to reduce the achievement gap.

Recommendations Related to DLR Support Features

Many of the recommendations for the design of DLRs were to include specific features that the educators felt could support EL students in accessing and understanding DLR content.

Provide visual and auditory support features to assist EL students in understanding and communicating new content and vocabulary.

Teachers and administrators indicated that in their view visual and auditory supports could assist EL students in understanding and communicating academic content. Visual supports can be images, photographs, or as one district administrator suggested, can be video definitions for words that may be difficult to define through a single visual image. The educators noted that such visual supports might assist EL students in understanding new terms and concepts.

Auditory supports mentioned included a text-to-speech feature. Such a feature can enable EL students to hear a single word, a text selection, or to have instructions read aloud. Several district administrators and teachers also suggested a record-and-replay feature that enables a student to record and then listen back to his or her voice. Some suggested that this feature is useful in that it allows EL students to listen to and improve their own speech in English. Some also noted that a record-and-replay feature could offer an alternative means for EL students to share or demonstrate their knowledge when they are not yet proficient in writing. Educators also noted that DLRs can offer multiple, multi-modal supports for their users. For example, a teacher suggested, *"develop[ing] items with online dictionaries that work in multiple modalities (read the definition, hear how the word is pronounced, see a picture or video of it)."*

Provide an embedded translation function.

One teacher mentioned that, although her students could use a separate translation tool, a better option is to have a translation capability embedded as part of a content area DLR so that the translation given to the EL student provides the meaning most appropriate to the specific content the students are learning.

Provide embedded support features in a wider range of EL students' languages.

For example, several teachers recommended providing translation features within DLRs that support a broader range of languages beyond those most commonly provided to better meet EL students' needs.

The study team summarized the support features addressed in the recommendations and created a preliminary framework of support features. The *Digital Support Features Matrix* (Appendix E) identifies support features in four categories:

1. **Visual-related supports:** Visual images or other visual support designed to assist a student in understanding or communicating a concept or idea.

2. **Auditory-related supports:** Speech or other use of sound designed to assist a student in understanding or communicating a concept or idea.
3. **Translation supports:** Embedded functions designed to translate from one language to the other, in either speech or print and for either a word or limited text.
4. **Collaboration supports:** Embedded functions designed to assist students to communicate, collaborate, work, or share information about academic content.

Recommendations Related to Implementation

Design DLRs that are easy to use, both for EL students and teachers.

Many teachers and districts focused on the importance of ease of use for EL students in navigating within and using the features of a DLR. Several teachers suggested that the log-in process should be faster and directions should be simple to support student use. Teachers pointed out that navigating within DLRs may be challenging for young students, for students with little experience with computers, and for beginner-level EL students whose English proficiency limits their ability to understand DLR directions. In general, teachers suggested making it easy for EL students to get into the core of the DLR content or task, rather than requiring multiple logins and other navigational steps before they can begin their actual work.

Several teachers and districts recommended that DLRs should be easy for teachers to use as well. For example, one recommendation was to make it faster and easier for a teacher to quickly "roster" a class of students into a DLR (i.e., as part of setting up a DLR for use, entering in the students who will be using the DLR). Another comment was that teachers could more easily work with a DLR if they had access to embedded general user support to guide them as users and offer instruction-related guidance, such as how to facilitate students' work within the DLR.

These examples offer insights into the earlier Chapter II findings on criteria in selecting DLRs. In those findings,[21] the majority of districts reported considering ease of use for teachers, almost all teachers considered how easily students could use the DLR, and most teachers reported considering how easily they themselves could use the DLR.

Develop DLRs with age-appropriate interfaces, especially for older newcomer EL students and for very young students.

As noted earlier in this chapter, many respondents recommended appropriate grade-level content for older beginning level EL students. Several teachers had similar recommendations about the design of DLRs — their appearance and structure. A case study teacher noted that the type of illustration selected to visualize the meaning of a concept or new vocabulary word for a first or second grader can often be too juvenile for a middle school or high school student. Another teacher commented on the nature of the tasks given students:

[21] See Chapter II, Exhibit 7, showing that 66 percent of districts reported that when selecting DLRs they considered it very important that a DLR is easy for teachers to use; and see Exhibit 9, which presents the finding that 86 percent of teachers reported that whether a DLR is "easy for me to use" was very important for them in selecting DLRs.

> *"Activities for high school students should be available without appearing 'pre-schoolish' even when simple letters, numbers, words need to be taught."*

Some teachers noted that DLRs do not always take into account the learners' developmental level. For example, one teacher noted that DLRs for very young students should require use of only a mouse or other means more appropriate to the manual skills of young children, rather than requiring them to use a keyboard. A case study teacher commented that the DLR fonts sometimes were too small for young children.

Provide DLRs that are free or less costly and that take into consideration limitations in funding.

DLR costs were a factor in many districts' and teachers' recommendations, and teachers often referred to limitations in district or school funding for DLRs. This recommendation is consistent with survey findings reported in Chapter IV that costs of purchasing DLRs and limited funds for DLRs were barriers.[22]

Enable teachers to monitor and students to track their progress.

Both districts and teachers referred to features that enable teachers and students to monitor and track students' progress within a DLR. For example, a teacher commented:

> *"All students lose interest quickly if they do not see the progress they are making."*

Recommendations Related to Professional Development and Training

Provide professional development and training for teachers on how to work with DLRs in their classroom instruction of EL students.

Several of the districts referred to their teachers' needs for professional development and training related to using DLRs. A common theme among their recommendations was the need for training on how to use DLRs effectively in the classroom. Some specifically pointed out that their recommendations were directed toward educators and education policy-makers. Comments included:

> *"[I have no recommendations] for the developer. Internal professional development leaders within our district need to be able to coach teachers in a classroom setting to ensure the materials are being used as they were intended, especially assessment pieces for ELs."*

> *"[Our district] requires professional development in this area, as [teachers] are not implementing DLRs comprehensively across the district. An overview of effective DLRs and how to best implement them in daily practice would be beneficial."*

[22]See Chapter IV, Exhibit 29, which presents the finding that 75 percent of districts reported that insufficient funds for purchasing DLRs was a barrier to some extent or to a large extent to their use of DLRs; and see Exhibit 30, which shows that 67 percent of teachers considered the costs of DLRs as a barrier to some extent or to a large extent to their use of DLRs in instructing EL students.

Some of the comments also referred to embedded professional development within DLRs as helpful: *"[The DLR] resource should also offer on-demand professional development."*

Incorporate hands-on training and coaching.

Many of the teacher comments on how best to improve the usefulness of DLRs in instructing EL students referred to their needs for professional development and support. Teachers emphasized their need for hands-on training so that they can more fully understand how to incorporate DLR use in instructing their EL students. Comments included:

> *"Many times when we have trainings, someone is talking the entire training. Most of us need hands-on training."*

> *"There needs to be adequate time given not just to learn, but to implement any DLR, or anything else. Having a 30-minute or even a couple of hours of a lecture and someone demonstrating how to do something isn't very effective. We need training on how to use it and get to practice and discuss while the information is fresh."*

Structure professional development to focus on how to use DLRs to support EL students within general education classes.

The survey findings showed that most teachers reported engaging EL students in instruction using at least some general education DLRs. In the case study, several mainstream teachers described EL students working with the same general education DLRs as other students in the class. Recommendations pointed to teachers' needs for guidance on using DLRs to support EL students' in general education classroom instruction. The recommendation applies both to educators and educational technology developers. For example, an EL specialist stated:

> *"Our administrators and technology support personnel are very good at finding and integrating the newest technology with our general education students but there is little to no support for our English learners. Teachers need to know not only what is out there but how to use it for our ELs and how to use it within the classroom while also addressing the 20+ other students in the room. Reaching our ELs without having to pull them from the general education classroom is very important."*

Assist administrators and teachers to build awareness of the range of DLRs and how to select DLRs appropriate to their EL students.

Among the requests for professional development, several teachers described a need to know more about the range of DLRs available, how to select among them, and how to determine which are most appropriate for their EL students. For example, some teachers requested guidance in becoming aware of and selecting DLRs:

> *"I would like to attend more professional development about the different types of DLRs available to use with EL students instead of having to do a lot of online researching on my own."*

To assist administrators and teachers in considering the range of DLRs available, the study team developed and refined the *Digital Learning Resources Matrix* (Appendix E). The matrix defines the same three categories of DLRs introduced earlier: digital academic content tools, digital productivity tools, and digital communication tools. It outlines and offers some examples of the types of DLRs within each of the categories. The matrix may be a useful resource for educators to consider the range of DLRs available and to consider the differences and purposes among them.

Additional Areas of Support That Teachers Request

Teachers also responded to a survey item that asked about areas in which they would appreciate additional support related to using DLRs with EL students. Half or more of the teachers indicated that they wanted additional professional development and support in several aspects of preparing to use DLRs in instructing EL students, including planning, understanding the range of DLRs available, planning for effective mixed use of DLRs with non-digital resources, and understanding criteria to use in selecting DLRs for EL students (Exhibit 31). EL specialists were more likely to express a desire for planning for effective mixed use of DLRs with non-digital resources (75 percent vs. 49 percent) (Exhibit C-20).

Exhibit 31. Percentage of teachers reporting areas in which they would appreciate more support related to DLR use with EL students

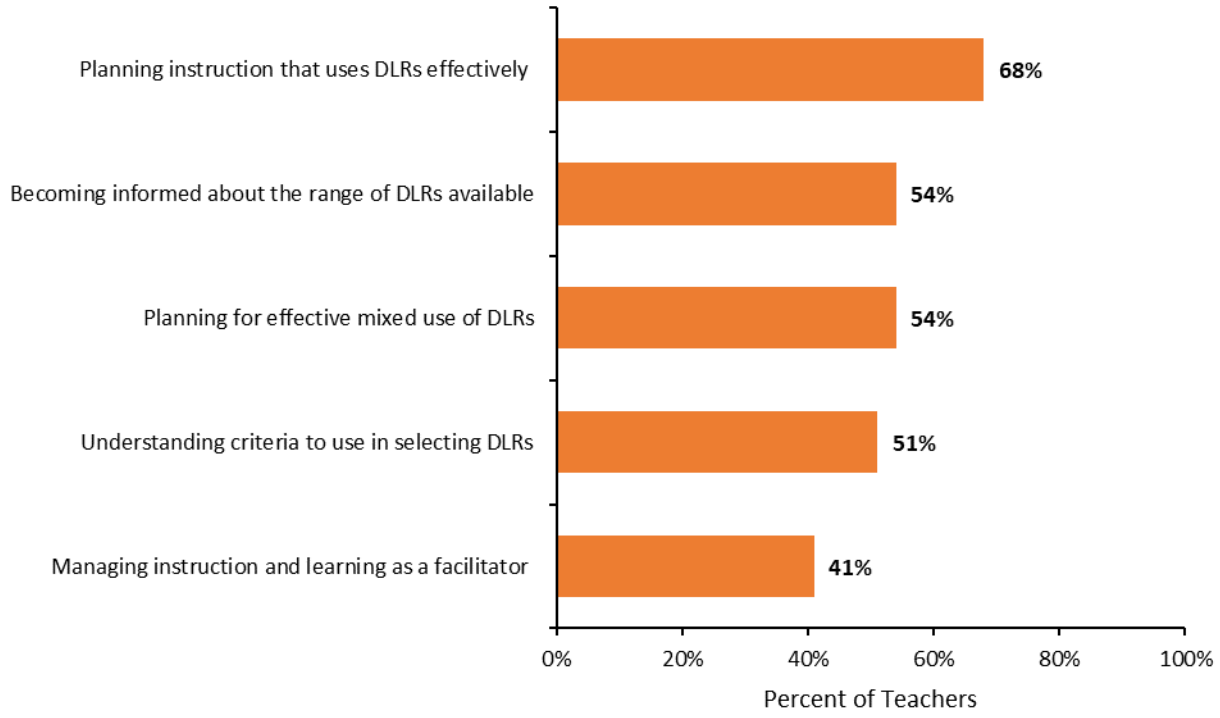

Exhibit reads: Sixty-eight percent of teachers of EL students reported that they would appreciate more support in planning instruction that uses DLRs effectively with EL students.

Source: Teacher survey, item 38 (*n* = 679 teachers).

First-year teachers were more likely than experienced teachers to indicate that they would appreciate more support in planning instruction that uses DLRs effectively (96 percent vs. 66 percent). However, first-year teachers were less likely than experienced teachers to respond that they would like more support in the area of planning for effective mixed use of DLRs and non-digital resources (30 percent vs. 55 percent) (Exhibit C-21). There were no statistical differences between teachers by grade level.

Chapter VI. Conclusion

This study sought to understand the use of DLRs in instructing EL students. The study asked districts and teachers to report how they identify the DLRs they use with EL students, the types of DLRs used and what they perceive as supports for and barriers to using DLRs with EL students. The study also elicited perspectives on how educational technology developers and educators might improve the usefulness of DLRs for instructing EL students.

District and teacher survey responses indicated widespread use of DLRs in school year 2016–17. Most districts reported placing a high priority on using DLRs and most teachers reported that they used DLRs in instructing their EL students. Both districts and teachers reported using a number of sources for identifying DLRs. Almost all districts reported that they used teacher requests or recommendations as sources for identifying DLRs for EL students and almost all teachers reported that they obtained recommendations from their fellow teachers, sometimes seeking out those they viewed as technology leaders in their school or district. However, many teachers — EL specialists in particular — reported receiving 10 or fewer hours of professional development related to DLR use over the three-year period of 2014–15 to 2016–17. Teachers requested additional professional development, including hands-on guidance and support in using DLRs and in using DLRs for instructing EL students specifically.

Districts and teachers reported using multiple types of DLRs, and the majority of teachers reported daily DLR use. Almost all teachers who reported using DLRs in instructing their EL students reported that at least some of those DLRs were designed for general education students. In case study interviews, some teachers commented that the general education DLRs they used sometimes included embedded supports, such as visual supports and translation features, that they felt could help their EL students to understand the DLR content and tasks. Districts and teachers recommended that DLRs be designed to include more supports for EL students to help them to engage in academic content and work with their peers while building language and literacy skills.

Districts and teachers reported a range of barriers to DLR use for EL students, with student lack of access to DLRs at home being the most commonly reported barrier. Districts also pointed to lack of funding for DLRs, teachers' need for expertise in instructing EL students, teachers' level of technology skills, and lack of knowledge of DLRs for EL students. Key barriers reported by teachers included time needed to set up and to learn DLRs, DLR costs, and the lack of knowledge of available DLRs and how to choose among them. The need for greater access to technology equipment was also a theme that emerged in open-ended comments in the survey and in case study interviews.

Study respondents offered suggestions on steps to improve DLRs and their use for instructing EL students. Their recommendations for educational technology developers addressed the content of DLRs, the types of embedded supports, and DLR design to improve implementation, such as ease of use, and designs appropriate to the ages and experience of the EL students. Recommendations for district leaders were to provide more access to DLRs and more opportunities to learn about DLRs and their instructional use with EL students — especially for use with EL students in general education settings.

Further research is needed to understand the efficacy of these recommendations and of practices in using DLRs when instructing EL students—including EL students with disabilities and their requirements for accessibility. The findings of such research could inform guidance for educators in selecting and using DLRs to better support learning for all EL students, as well as for students overall in grades K–12.

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