

Evaluation of the Digital Lizards of Doom Level 1 Curriculum

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I. Contents

EXECUTIVE SUMMARY	2
INTRODUCTION.....	3
Overview of Digital Lizards of Doom	3
Overview of the Evaluation.....	4
METHOD	5
Research Design	5
Participants	5
Measures.....	7
Analytical Approach.....	10
RESULTS	11
Impact Analysis.....	11
Main Impact.....	11
Subgroup Analyses	12
Participant Experiences with DLOD	15
Teachers' Early Impressions of DLOD	15
Teachers' Perceptions of Student Achievement.....	17
Teachers' Perceptions of Student Engagement.....	24
Teachers' Perceptions of Implementation Requirements.....	28
Teachers' Perceptions of Program Strengths and Weaknesses.....	29
Teachers' Recommendations for Improvement	31
DISCUSSION	32
Achievement Impact.....	33
Program Design Qualities.....	33
Study Design and Measurement Factors	33
REFERENCES	34
APPENDIX A: READING STANDARDS	35
APPENDIX B: DLOD TEACHER INTERVIEW PROTOCOL	37
APPENDIX C: EQUIVALENCE FOR FULL SAMPLE.....	38
APPENDIX D: IMPACT ANALYSES	39



EXECUTIVE SUMMARY

Digital Lizards of Doom (DLOD) is a multimedia sci-fi fantasy series that aims to engage elementary school students and inspire them to be capable, imaginative, and skillful readers. The graphic novel's engaging characters and unique format has intrigued both teachers and students. Based on teachers' positive feedback about using DLOD in classrooms, the graphic novel's authors sought a formal evaluation of the curriculum.

- The present study employed a quasi-experimental design (QED) with mixed methods to evaluate the implementation and impact of the DLOD curriculum, as well as perceptions of teachers who used it.
- A major focus of the evaluation was to understand teachers' experiences and perceptions and to explore its potential impact on reading scores.
- Given that DLOD is a supplemental literacy program, fully implemented in only 3–4 consecutive weeks of the school year, and commonly used by teachers for enrichment purposes, we view the QED examination of achievement gains as exploratory and the qualitative study component as potentially providing highly meaningful evidence of DLOD's efficacy as a supplemental literacy program.
- The study took place in the San Diego Unified School District; a large, diverse district in southern California where 11 teachers in five schools implemented the program with students in Grades 3–5.
- Treatment group classrooms used the 16-lesson curriculum during daily literacy blocks in lieu of the "business as usual" approach in comparison classrooms.
- Data sources and measures for the current study included student achievement data, curriculum content, curriculum implementation observation data, and teacher interviews.
- A small, non-statistically significant positive effect was found for the impact of DLOD participation on student FastBridge aReading scores; no differential effects were found in the subgroup analysis.
- A significant interaction between grade level and treatment showed that students in higher-grade DLOD classes demonstrated significantly higher Lexile Score gains than their comparison-group counterparts.
- The DLOD curriculum can be used to emphasize social emotional learning (SEL), although the curriculum does not name specific SEL standards.
- We found alignment between the California Common Core Standards for reading literature and teachers' practice using DLOD.
- Students were highly engaged by DLOD's format, the characters, the storyline, as well as the enrichment activities it offered.
- One theme that arose was the potential for DLOD to engage reluctant readers.
- Teachers found the DLOD curriculum easy to implement.
- Teachers found program strengths were its engaging story and adaptable curriculum materials.
- Teachers noted a need for more presentation and teaching materials and further scaffolding of the use of the audio and video resources.
- Recommendations for improvement of the curriculum included streamlining presentation materials to facilitate teachers' use, providing additional guidance for the use of audio and video components, and more explicitly aligning learning outcomes with reading standards and social emotional learning competencies.



INTRODUCTION

Overview of Digital Lizards of Doom

Digital Lizards of Doom (DLOD) is a multimedia sci-fi fantasy series including children's graphic novels, an audio book, and Manga series, as well as young adult novels. Beginning in the 2022-23 school year a teacher in the San Diego Unified School District began using the first book of the graphic novel series in the classroom and developed a curriculum guide to share with other teachers. The curriculum included 16 lessons that segmented the graphic novel and offered discussion questions and key points of focus related to character development, plot, and grade-appropriate literary terms. The graphic novel's authors sought a formal evaluation of the curriculum to understand the experiences of teachers who used it and explore its potential impacts for students.

DLOD curriculum content. Table 1 shows the downloadable materials available to teachers using the DLOD curriculum, and Appendix A shows the California Common Core State Standards for reading literature for Grades 3–5 (California Department of Education, 2013).

Table 1
DLOD Curriculum Resources

Resource	Description	Intended Use
Digital graphical novel	A downloadable version of Digital Lizards of Doom Level 1: Dizzy Doom, (147 pages).	Made available in addition to the paperback version students in treatment classrooms received.
Lesson plan guide	A 16-lesson guide for teachers with an introduction of the book (68 pages).	Pacing instructions and discussion questions for each lesson.
Map overview	A graphic presentation of the 16-lesson arc of the curriculum (2 pages).	Map for students to color in as they progress through the lessons.
Doomploma	A colorful, DLOD-themed certificate of completion.	Signed by the student and teacher to celebrate completion of the lessons.
Orchestral soundtrack	A 21-track orchestral soundtrack aligned with the graphic novel.	Tracks titled and sequenced to accompany lessons.
Coloring pages	A set of 16 drawings from the book.	The black-and-white drawings are sequenced to accompany the book and designed as an artistic curriculum extension for students.
Comic templates	A 2-page printable template for comic design.	One page of the template has space for text and the other for graphics; students are encouraged to develop their own comics.
Education videos	16 4-5-minute videos featuring characters from the graphic novel.	The videos develop characters' and engage students in math, science, and vocabulary enrichment.



Lesson Plan Guide. The introduction to the guide includes guidance for adapting the length and focus of the 16 lessons to fit a teachers' literacy blocks and daily schedules. The first two lessons introduce graphic novels, in general, as a literary format, as well as some of the unique features of the DLOD series. The rest of the lessons follow a "read, discuss, create" pattern and include both guidance for teachers and extension opportunities, such as readers' theater activities, end-of-lesson writing prompts, and graphic novel design templates for students.

Overview of the Evaluation

The creators of the DLOD curriculum, Dizzy Doom Media LLC, contracted with the Center for Research and Reform in Education (CRRE) to conduct an evaluation of the DLOD Level 1: Dizzy Doom curriculum during the 2024-25 school year. In this quasi-experimental design (QED) study, teachers in 11 Grades 3–5 classrooms implemented the DLOD curriculum. A major focus of the evaluation was to understand teachers' perceptions of students' achievement and engagement and to explore its potential impact on reading scores. Given that DLOD is a supplemental literacy program, fully implemented in only 3–4 consecutive weeks of the school year, and commonly used by teachers for enrichment purposes (i.e., stimulating interest in reading and class discussions of stories, characters, and themes), we view the QED examination of achievement gains as exploratory, to determine whether measurable benefits on a standardized assessment would be evidenced rather than for making a summative judgment of program effectiveness. That is, although DLOD is aligned with many of the California Common Core State Standards for reading literature for Grades 3–5 (California Department of Education, 2013), it is not intended to directly teach basic reading skills as would a core curriculum integrated learning system used to provide students with additional practice or adaptive lessons. Accordingly, we viewed the qualitative study component, involving classroom observations and especially teacher perceptions of the program, as potentially providing highly meaningful evidence of DLOD's efficacy as a supplemental literacy program.

For the QED analysis, students' reading achievement gains on pretest and posttest reading assessments were compared to those of students in classrooms in the same schools that continued "business as usual" curricula and thereby served as a control group. The achievement measure was the FastBridge aReading (Illuminate Education) assessment administered in the winter (before using DLOD) and in the spring (after using DLOD). Curriculum analysis, classroom observations, and teacher interviews examined teachers' perceptions and uses of the DLOD curriculum. The following research questions guided the study:

- 1a. Do students in classrooms who used the curriculum demonstrate improved assessment scores when compared with comparable classrooms that did not use the curriculum?
- 1b. Do subgroups of students demonstrate significant variation in impact?
- 2a. What are teachers' perceptions of the program regarding student achievement?



- 2b. What are teachers’ perceptions of the program regarding student engagement?
- 2c. What are teachers’ perceptions of the implementation requirements?
- 2d. What are teachers’ perceptions of the program's strengths and weaknesses?
- 2e. What recommendations for improvement do teachers offer?

METHOD

Research Design

The overall research approach was a convergent, parallel mixed-methods design as described by Creswell and Plano Clark (2011). To evaluate the effectiveness of DLOD on student learning, we employed a quasi-experimental design (QED). A total of 11 third-, fourth-, and fifth-grade teachers in the treatment group used the DLOD curriculum resources to deliver 16 daily lessons (approximately 45-60 minutes each) to their students ($n = 389$) over a 3–4 week period. All treatment classroom teachers started the lessons following the school years’ winter FastBridge assessment and before the spring assessment. Treatment classroom teachers implemented the program during language and literacy blocks, while comparison school teachers ($n = 5$) continued their normal (i.e., “business as usual”) approach. Comparison classrooms were in the same schools as treatment classrooms. Classrooms in both treatment and comparison groups devoted the same amount of time to language and literacy instruction. Qualitative data were collected to supplement and explain quantitative analyses.

Participants

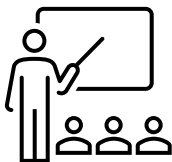
Details about study participants are presented below.



5 schools



389 Grades 3-5 students



11 Treatment classroom teachers
5 Comparison classroom teachers



4 Interviewees

The study took place in the San Diego Unified School District (SDUSD), a district in southern California with 113,787 K-12 students and 138 elementary schools as of the 2024-25 school year. SDUSD is a diverse district, with a large Hispanic population (44.7%), roughly 60% of students eligible for free and reduced-price lunches, and 16% English Learners. Demographics of the analytic sample are presented in Table 2. A total of five elementary treatment schools were identified, based on principal and staff interest. Across those schools, there were a total of 16 third-, fourth-, and fifth-grade teachers, of which 11 teachers used the DLOD curriculum. Of these 11, four teachers



were observed using it, and four teachers were interviewed about their experiences and perceptions.

Table 2
Demographics of Analytic Sample

	All Students %	Treatment %	Comparison %
Female	52.2	52.5	51.1
Black	2.3	1.7	4.4
White	32.9	29.1	45.6
Asian	19.5	20.1	17.8
Hispanic	17.0	19.1	10.0
Mixed	19.8	19.7	20.0
Filipino	8.5	10.4	2.2
Grade 3	36.5	25.8	72.2
Grade 4	19.3	25.1	0.0
Grade 5	44.2	49.2	27.8
Special education	14.1	15.4	10.0
English Learner	5.1	5.4	4.4
<i>n</i>	389	299	90

In both the overall sample, as well as the analytic sample (defined as students with non-missing pretest, posttest, and demographic data), the treatment group was larger, with a somewhat larger percentage of students from Hispanic and Filipino backgrounds, while a higher proportion of the comparison group was White. The treatment group was also older with 49.2% of students in Grade 5, while the analytic sample comparison group did not include any Grade 4 students.

Baseline equivalence was met for all variables except for grade for the full sample and analytic sample, with a standardized mean difference of less than 0.25 SDs. Grade level did differ between the treatment and comparison groups, with more treatment students in Grades 4 and 5 compared to the comparison group. While 64.3% ($n = 72$) of the comparison group was in Grade 3, just 26.03% ($n = 82$) of the treatment group was in Grade 3, while 24.76% ($n = 78$) were in Grade 4 and 49.21% ($n = 155$) were in Grade 5. This was largely an artifact of different overall sample sizes. Statistical matching techniques were attempted but resulted in samples with insufficient power for analysis. In addition, the full model did fulfill the baseline equivalence requirement for prior achievement, which is the most powerful indicator of similarity. Baseline equivalence tables can be found in Table 3 for the analytic sample and Appendix C for the full sample.



Table 3
Baseline Equivalence for Analytic Sample

Analytic Sample	All students <i>n</i>	<i>n</i>	Treatment <i>M</i>	<i>SD</i>	<i>n</i>	Comparison <i>M</i>	<i>SD</i>	Treatment-Comparison Difference <i>M</i>
FastBridge Pretest (Winter) aReading Score	389	299	518.02	25.24	90	511.82	25.35	0.245
Grade	389	299	4.23	0.83	90	3.56	0.90	0.781
Gender	389	299	0.47	0.50	90	0.49	0.50	0.028
Minority Status	389	299	0.40	0.49	90	0.34	0.48	0.124
English Learner Status	389	299	0.05	0.23	90	0.04	0.21	0.042
Student Disability Status	389	299	0.15	0.36	90	0.10	0.30	0.162

Measures

To address the research questions, the study team gathered and analyzed data including student achievement data, curriculum content data, classroom observation data, and interviews (see Table 4).



Table 4
Research Questions with Data Sources and Measures

Research questions	Student FastBridge achievement data	Student demographic data	DLOD curriculum content	Classroom observations	Teacher interviews
1a. Do students in classrooms who used the curriculum demonstrate improved assessment scores when compared with comparable classrooms that did not use the curriculum?	✓	✓			
1b. Do subgroups of students demonstrate significant variation in impact?	✓	✓			
2a. What are teachers' perceptions of the program regarding student achievement?	✓	✓	✓	✓	✓
2b. What are teachers' perceptions of the program regarding student engagement?			✓	✓	✓
2c. What are teachers' perceptions of implementation requirements?			✓	✓	✓
2d. What are teachers' perceptions of the program's strengths and weaknesses?			✓		✓
2e. What recommendations for improvement do teachers offer?			✓		✓

FastBridge aReading. FastBridge aReading assessment is a computer-administered adaptive screener for Grades K-5 students, which was designed by Illuminate Education to measure reading ability and predict overall reading achievement. aReading includes items related to phonological awareness, phonics, vocabulary, and comprehension. It also includes measures from the Lexile® Framework for Reading, allowing for assessment of risk level. It was administered in SDUSD three times a year in fall,



winter, and spring. The assessment is vertically scaled, allowing for direct comparison of students across grade levels.

Curriculum implementation observations. We conducted five field observations involving the DLOD curriculum (Table 5). The first four observations were conducted in the classrooms of four participating teachers while they taught the curriculum, and the fifth was conducted at the 2024 Emerald City ComiCon, where authors demonstrated and described the DLOD curriculum.

Table 5
Field Observation Details

Observation	Setting	Count of Students/ Participants	Lessons / Interactions Observed	Duration
Observation 1	4 th grade classroom	32	Lesson 5: Learning Character Traits Through Artwork and Subtext	30 minutes
Observation 2	5 th grade classroom	31	Lesson 5: Learning Character Traits Through Artwork and Subtext	40 minutes
Observation 3	5 th grade classroom	30	Lesson 4: Study of Character Traits	30 minutes
Observation 4	3 rd grade classroom	23	Lesson 5: Learning Character Traits Through Artwork and Subtext	30 minutes
Observation 5	Conference presentation	60	The Digital Lizards of Doom universe and the creating of <i>Lava or Licorice</i>	90 minutes

Teacher interview protocol. The semi-structured interview protocol (Appendix B) aligned with the research questions and consisted of 16 questions that solicited participants' perceptions regarding implementation, usability, perceived benefits of the DLOD curriculum for students and teachers, strengths, weaknesses, and recommendations for future use. All teachers in treatment classrooms were invited to participate in interviews. Across the schools, four teachers agreed to be interviewed (Table 6). The researcher who observed classroom instruction also conducted the interviews. One teacher was interviewed in person following the lesson observation and three were interviewed through video conference after completing all lessons.

Table 6
Teacher Interview Details

Interview	Grade	Count of Students	Teacher Years' Experience	Duration	Transcript Pages
Interview 1	3 rd	23	15+	13 minutes	2



Interview 2	5 th	29	25+	19 minutes	8
Interview 3	5 th	30	15+	15 minutes	7
Interview 4	5 th	31	15+	28 minutes	12

Analytical Approach

Hierarchical Linear Modeling (HLM) with students nested within teachers was used to examine the impact of the DLOD Level 1: Dizzy Doom curriculum on student reading achievement gains, as participation decisions were made at the teacher level across five schools. Separate HLM models were constructed using each of the FastBridge aReading scores and other related literary measures as an outcome variable and winter FastBridge scores as the pretest. Covariates in each model included student demographic variables including gender, grade, ethnic minority status, English learner status, and student with disability status, as well as dummy variables for each elementary school. Subgroup analyses were conducted by constructing interaction terms between the treatment and subgroup indicator variable to estimate differential effects for demographic variables of the treatment impact. These variables were then included in additional HLM models.

Curriculum resources were analyzed by comparing data from curriculum documents and classroom observations with California Common Core State Standards for reading literature to identify whether the DLOD curriculum created opportunities for teachers to focus on each standard.

Qualitative data from interviews and observations were analyzed using the constant comparison approach described by Miles et al. (2019). Interviews were conducted and recorded using Zoom (Version 6.5.9), transcribed using NottaAI (2025), and uploaded for thematic coding in NVivo (Release 1.7.2). Typed observation notes were uploaded into NVivo (Release 1.7.2). Qualitative data were analyzed using an iterative method consistent with interpretive studies (Merriam, 2009; Patton, 2002) and a set of a priori codes and emergent subcodes aligned with the study's research questions (Table 7). Data were first coded by segmenting and then assigning labels to passages of text. Following this initial coding, similar codes were combined to develop themes.

Table 7

Qualitative Codes, Sub Codes, and Frequency Counts

Codes	Sub Codes	Count
Teachers' backgrounds	-	4
Early impressions of the DLOD curriculum	-	6
Use of the DLOD curriculum	Experience	24
	Adaptations	5
	Suggestions	6
Social and emotional learning	-	7
Curriculum standards	Key ideas and details	19
	Integration of knowledge and ideas	3



Codes	Sub Codes	Count
	Craft and structure	9
Student engagement	-	25
Enrichment elements	Orchestral soundtrack	7
	Education videos	6

Triangulation was employed through the use of multiple sources of data (e.g., teacher observations and interviews) and by using multiple researchers during data analysis strategies to establish validity of findings according to Creswell and Plano Clark (2011).

RESULTS

This section of the report begins with findings related to overall impact of participation in the program on student reading. Then, we present results pertaining to subgroup analyses; followed by findings from curriculum analysis, classroom observations, and interviews.

Impact Analysis

Here we present the main impact analysis followed by analysis of impact for subgroups.

Main Impact

RQ 1a. Do students in classrooms who used the curriculum demonstrate improved assessment scores when compared with comparable classrooms that did not use the curriculum?

Key Findings

- > A small positive directional effect was found for DLOD participation on student aReading scores ($ES = +0.009$), but this effect was not statistically significant.
- > The impact of DLOD participation on other FastBridge measures (aReading Lexile Score, aReading Risk Level, AUTOreading Risk Level, and aReading DfLR), was also not statistically significant.

For the main impact analyses HLM was used with students nested within teachers, and variables controlling for prior achievement and demographic variables, along with student grade level, are included in all analyses. We also include the results of supplemental HLMs that examined the impacts of participation in DLOD curriculum on other student-level FastBridge scores. The first main analysis examined the impact of DLOD on FastBridge aReading scores. The Spring 2025 aReading scores are the outcome variable, and the Winter 2024-25 aReading scores are the prior achievement variable. As shown in Table 8, a small positive but statistically nonsignificant effect was found for DLOD participation ($ES = +0.009$).

**Table 8***Impact Analysis of DLOD on Spring 2025 FastBridge aReading Overall Scale Scores*

Variable	Estimate	Standard Error	p Value	Effect Size
aReading Score	0.102	1.554	0.948	0.009
Constant	189.512***	14.843	<.001	
Variance of constant	0.000			
Residual	11.316			
Student N	389			
Teacher N	15			

Note. *** $p < .001$.

Table 9 depicts the key findings and effect sizes from models using other spring FastBridge measures as the outcome measure and their respective winter administration as the pretest. These variables include: aReading Lexile Score, aReading Risk Level, AUTOreading Risk Level, and aReading DfLR. The impact of DLOD participation on these values was not statistically significant.

Table 9*Impact Analysis of DLOD on Spring 2025 FastBridge Literacy Scores*

Variable	Estimate	SE	p Value	ES	Variance of Constant	Residual
Model 2: Spring aReading Lexile Score	-8.224	22.046	0.715	-0.055	162.226	22,000.078
Model 3: Spring aReading Risk Level	-0.022	0.070	0.760	-0.043	0.000	0.259
Model 4: Spring AUTOreading Risk Level	-0.111	0.097	0.253	-0.291	0.000	0.146
Model 5: Spring aReading DfLR	-0.001	1.555	0.999	0.000	0.000	128.311

Subgroup Analyses

RQ 1b. Do subgroups of students demonstrate significant variation in impact?

Key Findings

- > No differential effects were found by the HLM analysis of DLOD participation on aReading scores, suggesting that DLOD had consistent effects for all students.
- > The interaction term for Grade was statistically significant ($p = 0.043$) on Lexile scores, showing greater score gains for higher-grade students in the treatment group relative to comparison group students.



Subgroup analyses were conducted by building interaction terms between each subgroup indicator variable and the treatment variable. The results of the primary analysis, considering the impact of DLOD on spring aReading scores can be found in Table 10, with findings from sub-analysis models in Table 11 and full regression analyses in Appendix D.

Table 10 depicts the results of the HLM analysis of DLOD participation on aReading score with interaction terms included. No differential effects were found, suggesting that DLOD had consistent effects for all students, with no subgroup experiencing significantly different effects from participation in the program.



Table 10
Subgroup Analysis Results, DLOD Impacts on FastBridge aReading Scores

Variable	Estimate	SE	p Value
Minority Status	-3.347	2.864	0.243
English Learner Status	-7.716	6.847	0.261
Female	2.181	2.785	0.434
Parent Education	-1.197	1.679	0.476
Grade	2.711	1.649	0.101

Table 11 depicts the subgroup effects for Models 2-5 focused on each FastBridge score. No significant differential effects were found in these models, with one exception, again suggesting consistent effects for all participants. In Model 2, which uses aReading Lexile Scores, the interaction term for Grade was statistically significant ($p = 0.043$), suggesting as grade level increased, the effect of treatment increased significantly. In this one model, higher-grade students in the treatment group showed significantly greater Lexile Score gains than did lower-grade students. A similar directional trend on aReading DfLR scores approached statistical significance ($p = .08$).

Table 11
Subgroup Analysis Results, DLOD Impacts on FastBridge Scores and Risk Levels

Model 2: aReading Lexile Score			
Variable	Estimate	SE	p Value
Minority Status	-39.378	37.626	0.296
English Learner Status	-97.858	90.238	0.279
Female	25.423	36.554	0.487
Parent Education	-7.013	22.107	0.751
Grade	44.929*	21.887	0.043
Model 3: aReading Risk Level			
Variable	Estimate	SE	p Value
Minority Status	-0.196	0.129	0.130
English Learner Status	-0.278	0.307	0.365
Female	0.151	0.125	0.227
Parent Education	0.027	0.076	0.720
Grade	0.069	0.074	0.349
Model 4: AUTOreading Risk Level			
Variable	Estimate	SE	p Value
Minority Status	0.153	0.176	0.384
Female	0.035	0.161	0.830
Parent Education	0.049	0.115	0.668
Model 5: aReading DfLR			
Variable	Estimate	SE	p Value
Minority Status	-3.309	2.866	0.249
English Learner Status	-7.760	6.852	0.258
Female	2.229	2.787	0.424



Parent Education	-1.160	1.680	0.490
Grade	2.830	1.649	0.087*

Note. * $p < .05$.

Participant Experiences with DLOD

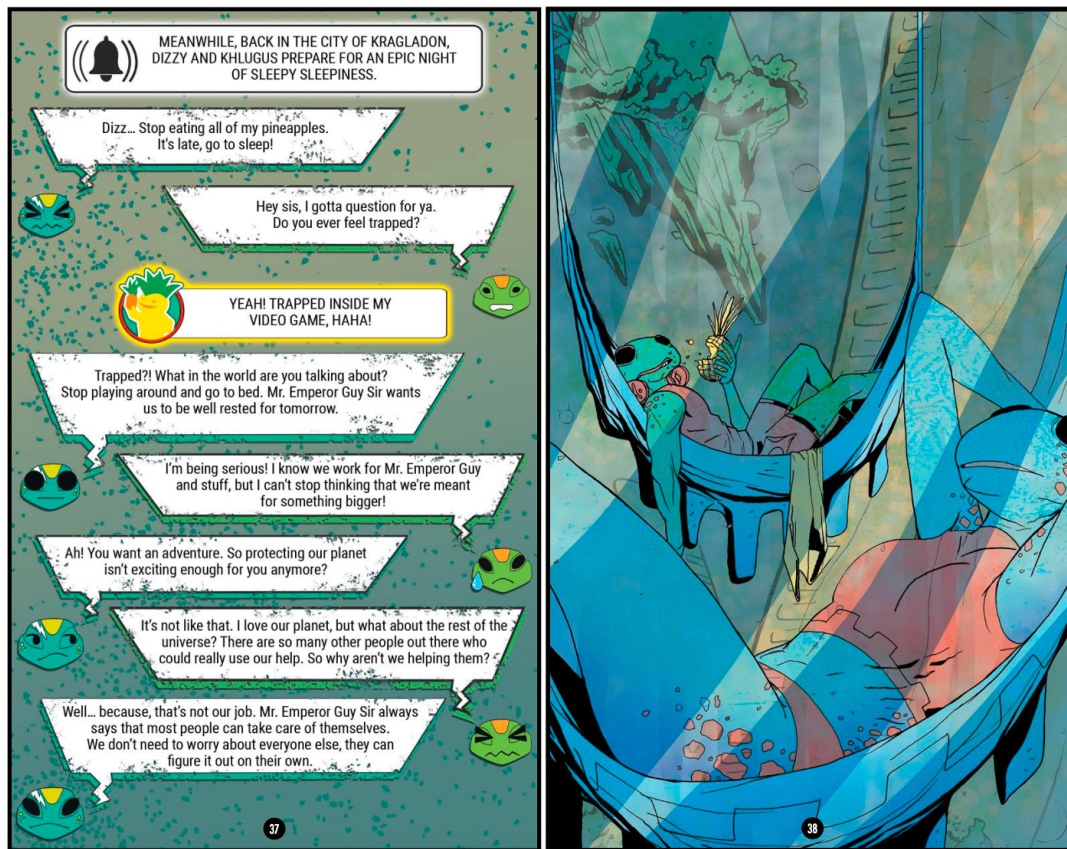
Teachers' Early Impressions of DLOD

We found that teachers chose to use the curriculum because their early impressions of DLOD intrigued them, and they believed their students would be interested as well. Teachers found that DLOD provided opportunities to hold discussions that centered on social emotional learning, as well as focused on standards for reading literature, with additional opportunities to emphasize writing and music appreciation.

The four teachers we interviewed chose to use the DLOD curriculum because they were intrigued by the unique format of the book and the enrichment resources. The graphic novel was formatted as a dialogue between characters, with the text presented on the left and the graphics depicting characters and actions presented on the right. The text appears as text-message bubbles, much like writing would appear on a chat thread in a messaging application. Small emoticons of the characters accompany each phrase they say, changing to match the mood and tone of the text (Figure 1). The students read these pictures to make inferences about meaning and importance.

**Figure 1**

Text Message Style Dialogue with Emoticons Left with Graphics Right



Note. Valentine & Najera, 2023, pp. 37–38.

The treatment classroom teachers we observed or interviewed using the DLOD graphic novel and curriculum guide with a range of grades and teaching methods. During classroom observations, teachers used the book for read-aloud lessons and led discussions using and adapting the prompts in the curriculum guide to extend students' thinking, and to emphasize grade-specific curriculum standards. Discussions explored the characters, their relationships, and conflicts that drove the story forward.

For example, discussing pages 37 and 38 (Figure 1), a teacher asked a series of questions from the lesson plan guide, "What are we seeing 'Dizzy' struggle with? What advice does 'Khlugus' give 'Dizzy'? Do you agree with 'Khlugus' advice? Show thumbs up or thumbs down." She saw many thumbs in the middle, "Why?" Several students explained that they were uncertain because they were interpreting conflict between the different clues from the text, images, and emoticons. The book was written to elicit this kind of speculation and inference from students, and lessons served to surface their thinking through discussion. Satisfied with the way students were gathering information from the dialogue, emoticons, and graphics, the teacher emphasized, "This is the kind of close reading I want you to do with texts."

Some of the teachers used the DLOD graphic novel and lesson plan guide to focus on writing and drawing. During interviews, teachers explained how they adapted the



curriculum. One explained how she used the writing suggestions at the end of each lesson as formative assessments to plan her next lessons. A third-grade teacher noticed that students were very eager to discuss the book and explain their thinking, so she developed a series of writing worksheets to accompany each of the book's lessons. These worksheets had prompts about the characters, their traits, the plot, the conflicts, and chances for the students to reflect upon their own lives in relation to the circumstances and challenges they saw the characters facing. In this classroom, the students' written work was then displayed prominently on the walls.

Teachers' Perceptions of Student Achievement

RQ 2a. What are teachers' perceptions of the program regarding student achievement?

Key Findings

- > The DLOD curriculum could be used to emphasize social emotional learning, although the curriculum did not name specific SEL frameworks or standards.
- > We found alignment between the California Common Core State Standards for reading literature and teachers' practice using DLOD, though these standards were not specifically referenced in the curriculum.

The DLOD lesson plan guide was aligned with, though did not specifically mention, reading standards for literature and social emotional learning (SEL). Through interviews and classroom observations, we examined how teachers used the DLOD curriculum to advance student achievement in these areas. To examine SEL learning opportunities we analyzed observation and interview data for indications of alignment with the Collaborative for Academic, Social, and Emotional Learning framework (CASEL, n.d.), a framework for applying evidence-based SEL. To investigate connections between the curriculum and K-5 reading standards for literature we analyzed observation and interview data using the California Common Core State Standards (California Department of Education, 2013). These qualitative results do not suggest either positive or negative findings about student learning, rather they illustrate some of the ways teachers in this study used the curriculum to support student achievement in these areas.

Social Emotional Learning

Observations and interviews showed that the DLOD curriculum could be used to emphasize social emotional learning in classrooms, although the curriculum did not name or describe any specific SEL frameworks or standards. Teachers used discussion questions from the curriculum guide to encourage students to discuss social and emotional aspects of the story, as well as social and emotional skills related to students' own experiences and relationships. The CASEL framework for considering SEL growth



included five SEL competencies—social awareness, self-awareness, relationship skills, decision-making, and self-management; four of which were represented in the qualitative data.

Although teachers were not using the CASEL framework explicitly, we observed that the DLOD curriculum provided opportunities to explore and develop these competencies. For example, when students discussed characters' feelings, motivations, and actions; teachers emphasized social awareness in ways that elicited students' self-reflection and sharing. Regarding self-awareness, students could identify and relate to the emotions of the characters through the content and tone of their dialogue, as well as through emoticons and facial expressions in the graphics. For example, a third-grade teacher's questions led students to discuss the inner conflicts that characters were struggling with; she observed, "Those struggles can help us grow." When she asked, "How does that relate to us?" students shared their own experiences of inner struggles, decisions they had made, and what they had learned about themselves and their friends in the process. She continued, emphasizing relationship skills, asking students to give examples of interpersonal conflict: "What is a conflict you've experienced and how does it help you grow?" Students were eager to share their insights openly with their classmates. In that classroom and others, the format of the book and lessons also created opportunities to focus on decision-making through exploration of the characters. Students analyzed the characters' situations, discussing what they might do next and what the students would do if they found themselves in the same situations. These findings do not suggest what students had learned related to SEL; however, they do indicate that the DLOD curriculum could create opportunities for teachers to emphasize student growth in SEL.

Readings Standards for Literature

Our research provided insight into how teachers perceived connections between the DLOD curriculum and the California Common Core State Standards for reading literature. Teachers explained and demonstrated these connections, although the lesson plan guide did not define nor articulate the standards. Teachers described how the DLOD curriculum assisted them in supporting student achievement in reading. One mentioned that, "The discussion questions made students think" about characters and their motivations. Another teacher described how the lesson plan guide's discussion questions helped her:

I really like to push kids to think about things at a higher level. And we did a lot of work when we asked the questions. I would say, 'Go back in the text and find the evidence that helps you figure out where you're getting that answer.' Some kids can't do that. I felt that the curriculum did that.

Another teacher expressed that in her experience, not all curricula pushed students' thinking the way DLOD did:

A lot of times when you see curriculum written out, you get like just really basic questions about the characters, you know, 'Who's doing what? Who is this



character? What happened here, and what happened there?’ instead of a discussion on personalities and motivations. I hope book discussions will make kids deeper thinkers. I mean, that’s the whole point, right?

The California Common Core State Standards for reading literature include three relevant clusters—key ideas and details, craft and structure, and integration of knowledge and ideas (Appendix A). Each of these clusters include three discrete standards. We observed alignment between these standards and teachers’ practice, though these standards were not referenced in the curriculum.

Key Ideas and Details Standards Cluster

Curriculum standards about key ideas and details in literature focus on quoting accurately from the text, examining and comparing characters, as well as determining themes from characters’ challenges.

Quoting Accurately

During observations, teachers asked open-ended questions and emphasized to students the importance of quoting accurately from the text to provide insights during discussions. In one instance, as a teacher opened a discussion of the book’s characters, a student offered observations about the childish ‘Spider Nose’ character:

Student: He seems to have a crush on ‘Warty Morda.’

Teacher: Give me evidence.

Student: Look, emojis, hearts in the eyes and there are words like ‘pretty.’

Examining Characters

The curriculum emphasized the characters’ motivations and actions. The students described how they understood the characters based on different kinds of details in the text and graphics. They used details from the language the characters used, as well as the way they were drawn frame-by-frame to make conclusions. For example, a teacher guided her students to notice the colors as well as the pictures, saying, “Nothing in an author’s book is an accident.” An interaction between the teacher and several students in another classroom illustrated this character examination:

Teacher: Based on ‘Dizzy’s’ words, how can we describe him?

Student: Deep.

Student: He’s poetic.

Student: He goes deep into stuff; most people kind of...won’t.

Student: ‘Dizzy’ wants to help the universe. He wants to expand the variety of who he is helping.

Students we observed were interested in gathering information from clues in the graphic novel to examine, discuss, and compare DLOD characters.



Comparing Characters

The DLOD lesson plan supported teachers in helping students compare characters to each other and compare characters to themselves across the arc of the story. A writing prompt in Lesson 4 introduced a “character spotlight” activity that asked students to choose a character, describe their traits, support their positions with evidence, and predict future actions of the character. In one classroom, the teacher prompted students to consider how the personality of the character they chose informed them about how that character might deal with challenges. One student chose 'Warty Morda,' who was “sneaky and deceptive” and would handle a challenge by “trying a trick;” another contrasted the “active and excited” 'Dizzy.'

Determining Themes from Actions

Teachers we observed focused on how characters’ traits informed their actions and how their actions emphasized themes from the story. An interaction in one classroom illustrated how teachers helped students recognize a recurring theme that students could relate to—'Dizzy' wants to do good in the world but is not sure exactly how:

Student A: 'Dizzy' wants to help. He has inner conflict. What's the word...? He's empathetic.

Teacher: Look at 'Dizzy.' He wants to do more but doesn't know how. He feels 'trapped.' This is an internal conflict.

Student B: Yes! He's like, should I be silly and joke around or should I save the universe!

Craft and Structure Standards Cluster

Curriculum standards aligned with the craft and structure cluster emphasize meaning making from both literal and figurative language, stories’ structures, and characters’ viewpoints.

Meaning Making

This standard focuses on determining the meaning of words and phrases including literal and figurative shades of meaning. The DLOD curriculum provided teachers opportunities to emphasize this standard. For instance, the book's format uses emoticons, and bolded words convey subtle meaning. This was illustrated in the text for Lesson 5 (Figure 2) as the facial expressions in the emoticons convey emotional meaning of the text. The passage including the emotional meeting conveyed in emoticons illustrates an inner conflict that 'Dizzy' (the lighter green character) is experiencing. When discussing this passage, students identified these emoticons and described how they changed from one phrase to the next to communicate about how the characters felt about the conversation they were having.



Figure 2
Text Emphasizing Shades of Meaning Through Bold Text and Emoticons



Note. Valentin & Najera, 2023, pp. 37, 39.

An interaction among students and the teacher in a fourth-grade classroom illustrated this:

- Teacher: What does 'subtext' mean?
 Student A: It's a blank part to fill.
 Student B: Maybe it's an extra picture?
 Student C: It's like a sub-title?
 Student D: ...a sub...marine?
 Teacher: It's the author whispering to you.

Of this literal and figurative meaning-making, a third-grade teacher explained that, for her students, unpacking the mystery and foreshadowing embedded in the lessons led her students to be more engaged in this book than they had been in others. She explained that this kind of meaning-making led her students to feel "In on the secret..." of what was happening in the story and what was going to happen. She thought this made them feel like informed, competent, and confident readers.



Parts of a Text

This standard focuses on examining and communicating about specific parts of stories such as characters, settings, and dialogues. The DLOD curriculum created opportunities for teachers to teach toward this standard. All the teachers we observed emphasized the importance of referencing the text specifically in their discussions. Discussing characters and their traits, one teacher told students to, “Turn to your study buddy, face them. Tell them a trait and evidence for a character’s motivation. Why does a character do that?” Another teacher guided students to examine the parts of the text deeply and share multiple points of evidence on their positions, “Look at the pictures. Look at the colors. This is a graphic novel. You have to study the pictures. The authors and artists make these on purpose. None of this is a mistake.” By providing text, emoticons, and detailed illustrations, the DLOD curriculum enabled teachers to emphasize this standard by articulating how the parts of text work together to tell the story.

Point of View

This standard asks students to be able to distinguish their point of view from that of the characters and to describe how a narrator’s point of view influences how events are described. The DLOD story was written intentionally to associate characters with particular traits, emotions, and attitudes. The lesson plan guide’s discussion questions emphasized exploring characters’ points of view through their dialogue, their emoticons, and the illustrations. In an interview, a teacher explained that her students appreciated considering the events in the story through the points of view of different characters. She described one such interaction, “We discussed whether one character who appears to be a good character, is really a good character, [I asked] ‘What evidence do we have that he might be kind of sneaky?’” Students were able distinguish key differences in characters’ points of view and their relationship to the story. An interaction in another classroom also illustrated this:

Teacher: What’s different about the way ‘Pineapple Pete’ talks?

Student: He talks to us!

Teacher: That’s called breaking the fourth wall, talking right to the audience, or the reader. Not a lot of books do that.

Integration of Knowledge and Ideas Standards Cluster

Curriculum standards aligned with the integration of knowledge and ideas cluster focused on connections between text, illustrations, and oral presentations, as well as comparison of books by the same author or across topics and genres.

Text, Illustrations, and Oral Presentation

This standard is focused on aspects of a text’s illustrations and how they contribute to what is conveyed. The DLOD curriculum evidenced opportunities for teachers to



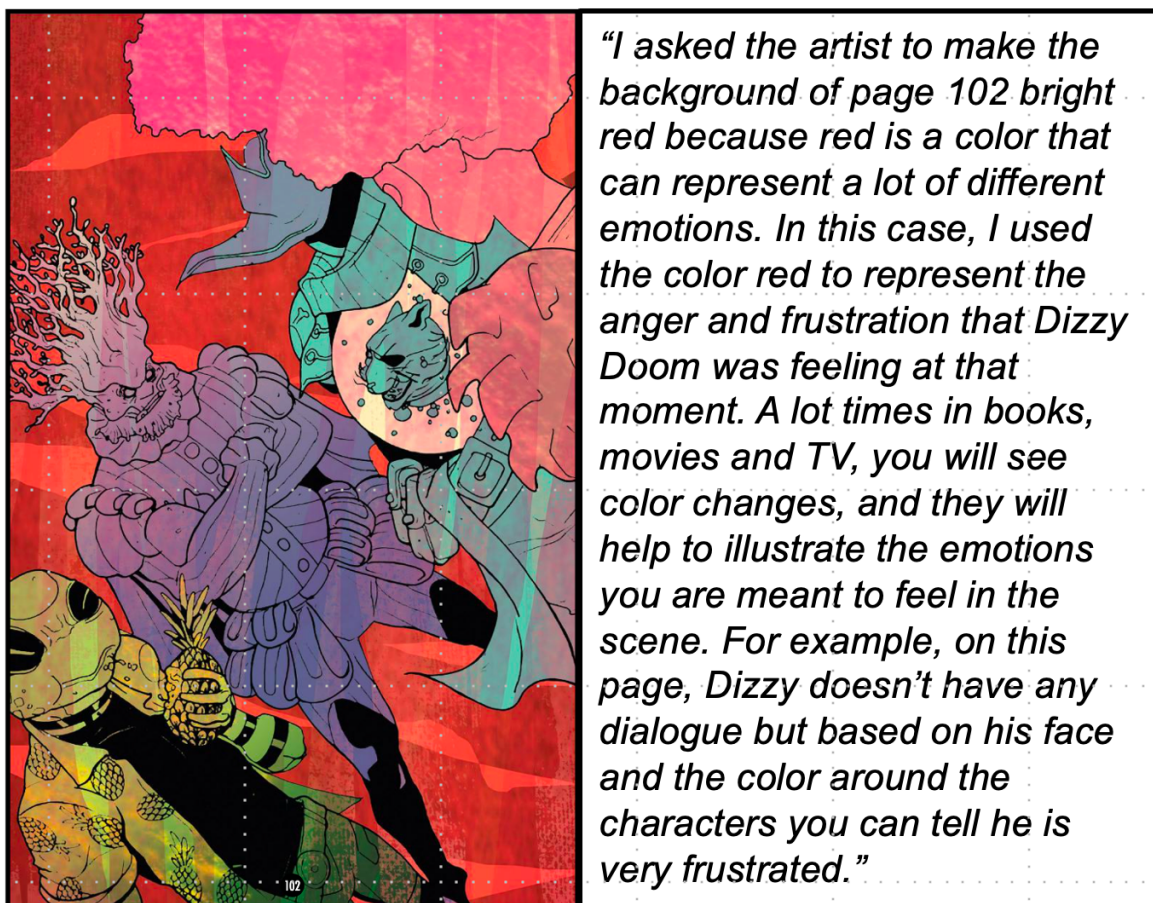
engage with this learning standard. Teachers explained during interviews that students, particularly more reluctant readers, could relate to the graphic presentation of the book and its unique text-message style format. One explained:

A lot of the kids ... were also struggling readers, not all of them, but a lot of them. And I think it is presented in a way that feels short, even if it's long, just because it's in that dialogue text form and the pictures really capture that too.

Students observed and explained how characters' emoticons changed and what that meant. Students were also keenly aware of small details "hidden" in the graphics. In one instance, just as the teacher began to read the text, a student cried out, "Hey there's someone in this picture with a blue cloak!" He and other students read these clues to make predictions before the teacher continued to read. The DLOD lesson plan guide provided indications to teachers about where and how to notice and describe these graphic details. For example, a Lesson 10 discussion question asked, "What do you think of the artwork on page 102? Did you notice the drastic change in background color? Do you think this was purposeful?" This is shown in Figure 3.

Figure 3

Color Schemes Chosen to Convey Meaning and Described in the Lessons



Note. Valentin & Najera, 2023, p. 102, Valentin & Najera, n.d., p. 53



Themes Across Authors, Topics, and Genres

This standard relates to comparing themes, settings, and stories by the same author or treatment of topics in different kinds of texts. The DLOD curriculum created opportunities to teach to this standard. Although our study focused only on a single book, teachers explained that some students found additional books in the series and referenced their insights in classroom discussion. One teacher described a group of these students and how their enthusiasm excited one another and served to expand the genre texts she will use in the future, “I don’t include fantasy a lot in my teaching just because it’s not something I actually really love. But I was like, ‘Oh man, this is something I haven’t tapped into.’”

Another teacher had a similar experience using the DLOD curriculum:

Not every kid loves graphic novels, but there are several kids who read those. Just as soon as they could get the other ones, they grabbed them. I had four students on the autism spectrum and one of them, he actually got a copy of the old, the original, version of the book; and the printing that’s out now is different. You know, they changed some of the art... they changed some of the story... And he was very much knowledgeable about that. He went into it and really got in depth in class discussions about what changed between the books.

We do not conclude that all students were as engaged as the above student, nor that all met this standard, however it was clear that a teacher could focus on this standard through the DLOD curriculum.

Teachers' Perceptions of Student Engagement

RQ 2b: What are teachers’ perceptions of the program regarding student engagement?

Key Findings

- > Teachers perceived students to be highly engaged by DLOD’s format, the characters and storyline, as well as the enrichment activities it offered.
- > One theme that arose across these observations and interviews was the potential for DLOD to engage more reluctant readers.

Teachers’ descriptions and classroom interactions suggested that students were highly engaged by its format, the characters and storyline, as well as the enrichment activities it offered. In a third-grade classroom, students shared aloud in turn their opinion of the DLOD graphic novel. As their responses were indicative of the ways teachers described students’ engagement, this section is organized in reference to those students’ perspectives. One theme that arose across these observations and interviews was the potential for DLOD to engage reluctant readers.



“I Like There is Writing on One Side and Pictures on the Other”

The DLOD book is written in a unique fashion. The text-message style dialogue appears on the left and the graphics appear on the right. A student summarized her experience reading in this format: “It’s easier to read with the words on the side.” Beyond being easier for some students to read, one teacher suggested that the novelty of this approach was, in part, why some students found it engaging, “It is unique in that the text format is not typical, the graphics and writing style are not typical, and it has audio and visual components. These features were intriguing [to students].” Another teacher explained that this format made it easy for students to feel a sense of rapid progress as they continued reading the book day after day. “It is presented in a way that feels short, even if it’s long, just because it’s in that dialogue text form.”

“I Like the Emojis”

On the dialogue side of each pair of pages, the text appears as text-message bubbles like they would on a discussion thread on a digital messaging application. Images of the characters' heads accompany each phrase they say. These images change facial expression to match what is written in the text. A fifth-grade teacher shared that students “... immediately understood what those [emoticons] were and so it was an easy way for them to access the text.” The students read these emoticons, or emojis, to make inferences about the meaning, tone, and importance of what the characters were saying. These expression clues gave readers information about what the characters were feeling, what they may be hiding, and how the dialogue drove the plot forward. Figure 4 shows a range of these emoticons for six of the primary characters.

Figure 4

Emoticons Express a Range of Emotions and Accompany the Characters’ Dialogue in the Text-Message Style Narrative



Note. Adapted from Valentin & Najera, 2023.



“The Characters – They Change”

The curriculum guide also prompted students at the end of the lessons to compare characters as they were in the beginning of the story to how they were at the end. In one classroom the teacher noted, “Good books will do that, the characters change as you read.” The curriculum was designed around character exploration.

The dialogue also lent itself to readers’ theater experiences, which the curriculum guide encouraged teachers to try. During observations of class read-aloud sessions, students read the text but also narrated the pictures, sometimes using voice characterizations to make the experience livelier. In one classroom, a teacher directed the students, “Read the next page; you can do the voices.” A few students cheered and cast themselves as characters and read taking turns and characterizing the voices.

“I Love the Videos!”

The DLOD curriculum included videos to accompany the novel. The 16 professionally produced videos featured the books’ characters fashioned as puppets. There were two types of videos, a gameshow called *Lava or Licorice*¹, in which characters compete to answer elementary-level math and science questions; and word-of-the-day segments in which the character ‘Dizzy’ introduced more advanced vocabulary words using context from the story to illustrate the words’ meaning. In both types of videos, humor was a central feature, and the characters expressed the traits and emotions they exhibited in the book. In classroom observations, several teachers showed the videos at the end of the lesson; students laughed out loud, excited to see the characters on screen. The videos were aimed to engage students more deeply in the story by bringing characters to life, and to encourage students to creatively pursue video storytelling on their own. During a conference presentation, DLOD creators showed a crowd of children and adults how they developed the videos to demonstrate how video stories such as these could be replicated at home with a bed sheet, free software, and a smart phone. One teacher described their experience using the videos in class:

You know, when you give them the opportunities to do those different things, whether it's participating in making a video or doing other projects, it just engages them more. It gives the characters a voice and there's still that sense of humor there. [Students] can get the author’s idea of what the character is supposed to look like and sound like. They were all about that!

“I Love the Music!”

The DLOD curriculum incorporated a 21-track orchestral soundtrack composed by the author to accompany the book. The tracks were inspired by the characters in the graphic novel and aligned to its pages. Although this enrichment element was not

¹ *Lava or Licorice* was awarded two bronze prizes at the 2025 Telly Awards, one in the General-Kids & Family category and one in the Series-Education and Discovery category.



specifically aligned with learning standards in music, it was intended to engage students in exploration of mood and emotion through musical tones. Two lessons in the curriculum guide suggested ways in which teachers could use the songs in their lessons. One suggestion was to use the instrumental album for background music during reading periods. Another suggestion in the curriculum guide (p. 11) prompted teachers to play songs while students examined specific pages before asking this series of exploratory questions:

- How does this song make you feel?
- What specifically about the song brings out that feeling?
- Do you think the song matches what's happening in the story? Why or why not?
- How is the song different from the last song you heard? Are there any similarities?

All the teachers we interviewed used the orchestral soundtrack when they taught the DLOD curriculum, and they had a range of experiences. A fifth-grade teacher shared that students: "Loved the music. As far as getting the vibe of the characters that go with the music and setting the emotions for it, they were into it. They liked it a lot." A third-grade teacher described that her students connected immediately to the musical component and were highly engaged in both music-focused lessons. She believed combining songs with pages in a school text was novel and interesting to them, and they were eager for this kind of experience. Another teacher found her students were not engaged by the soundtrack.

Engaging Reluctant Readers

All the teachers we interviewed observed that the DLOD graphic novel and lesson plan guide were engaging for the whole class, but also for more reluctant readers in particular. One teacher explained:

It was a pretty good mix of boys and girls with kids who were identified with some specific learning disabilities. I mean, there wasn't really any one group of kids that gravitated towards it. I think a lot of different kinds of kids liked it.

Another described:

Yeah, I did have one really reluctant reader who was into it and wanted the rest of the series. He was like, 'I'm gonna have my mom order it!' So yeah, I did have one that was a reluctant reader that really stood out to me as somebody who got into it.

Asked how she noticed that students were passionate about the book, a fourth-grade teacher shared:

[The students] wrote stories that mirrored it. They had to stop reading at points. And I think it's the first time in a really long time that my kids were like, 'No, can I



keep reading?' My [students'] parents bought the next series of the books for our classroom afterwards. Our kids brought some of them in and it got passed around. And it was a group of kids that sometimes I had a hard time getting them to read that were really intrigued in this fantasy.

Asked whether she saw students engaging who sometimes do not typically engage with reading and writing discussions, a third-grade teacher said, "Definitely!" She spoke of one outspoken student who, she said, "Almost never read the books" and seldom contributed ideas to classroom discussions. The teacher explained how a talkative child without knowledge of the book can be distracting. She explained that this student, and others who had been reluctant readers, found traction with this graphic novel, attributing this to two factors: 1) students found the characters in the story relatable and 2) the graphic novel used clues and foreshadowing to hook students' attention and keep them interested. A student summed this up simply, "I'm so curious what's going to happen!"

Teachers' Perceptions of Implementation Requirements

RQ 2c: What are teachers' perceptions of the implementation requirements?

Key Findings

- > Teachers found the DLOD curriculum relatively easy to implement and adaptable for their student groups.
- > Teachers also described how they were able to implement the curriculum in different ways to address different instructional needs.

Teachers we interviewed found the DLOD curriculum relatively easy to implement and adaptable for their student groups. The curriculum's 12-minute instructional video for teachers assisted them in understanding the materials and how they could use them to suit the needs of their classrooms. The curriculum orientation video included an introduction to the story and the DLOD curriculum, emphasizing the 'read, discuss, create' implementation process, as well as an overview of the contents of the Dizzy Doom Teaching Hub. The rest of the video briefly explained the lesson plan guide lesson by lesson, highlighting key points of detail and suggested uses. The teacher orientation video emphasized the opportunity for teachers to use and adapt the material flexibly to suit their classrooms. The teachers we spoke with found the DLOD curriculum was adaptable to multiple grades at the elementary level. One explained:

What a fifth-grader might get out of it would be different than a third-grader. Fifth-graders really could see how they were going and seeing the foreshadowing; they could infer things that I think a third-grader probably wouldn't get yet.

Teachers also described how they used the curriculum in varied ways. Some used the book as an independent reader, with classroom discussions and writing extensions.



Others used the books only as a classroom read-aloud, using the discussion prompts and video extensions. Teachers also appreciated the enrichment aspects of the curriculum, though they used them to varying degrees. They spoke specifically of the writing prompts, musical soundtrack, and video components. All the teachers we interviewed used the writing prompts but adapted them in different ways. A third-grade teacher explained that she had not intended to use the book for writing practice but changed her mind when she saw how engaged her students were. Another teacher noticed that students were very eager, so she had them write their own stories using DLOD's format. Another used DLOD quick-writes as daily formative assessments.

Teachers' Perceptions of Program Strengths and Weaknesses

RQ 2d: What are teachers' perceptions of the program's strengths and weaknesses?

Key Findings

- > Teachers found program strengths were its engaging story and adaptable curriculum materials.
- > Teachers found program weaknesses were a need for more presentation and teaching materials and further scaffolding for the use of the audio and video components.

Strengths

The treatment group teachers that we observed shared that the curriculum's strengths were that the story was highly engaging and the materials were adaptable and had a stimulating format that intrigued students in the characters and the plot.

Adaptability

As described above, teachers could flexibly use the materials in different ways and, when needed, develop their own materials to support classroom instruction. One teacher explained that she added group work components, another created writing worksheets, and a third had students develop their own longform stories in a similar theme. Teachers also appreciated the opportunity to choose whether and how to incorporate the audio and video extensions.

Intriguing Format

Another strength teachers emphasized was that the DLOD graphic novel and lesson plan guide were novel and intriguing for their students. They believed that the rich graphics, the unique text-message format, and the relatable characters drew their students in. One teacher shared, "This is a new genre that we've taken on. That's where I saw the bigger difference with my students and the passion they had with it." Another explained:



I'd say probably more than half of them [where highly engaged]. Some of them did not get into the book; it wasn't their genre. And I even told them, I said, 'This is not a genre I normally read.' But I went into it with, 'hey, this is a new thing for me. I'm trying it out. You guys are trying it out, too. And you never know, you just might like it.' And I ended up, I ended up liking it....it was a completely different style of anything I've ever read, but I enjoyed it.

Another teacher shared that the genre and format drew her in as well, sharing, "It looked like something interesting because I'm bored with our current curriculum. So, I thought we'll try this out and see how it goes and see how they do with it ." Another explained:

I always just read a little bit ahead before we read that day, but I hadn't read the whole book because I was trying something different because usually, I know the books that I'm teaching like front to back and I kind of wanted to be surprised with the kids.

Weaknesses

Teachers also shared their perception of weaknesses they saw in the DLOD curriculum. They mentioned specifically a need for presentation and teaching materials, as well as further scaffolding for the use of the audio and video components.

Classroom-Ready Presentation Materials

In terms of presentation, the teachers we observed either taught from the graphic novel without visual aids, used a computer to project content from the Dizzy Doom Teaching Hub, or made their own presentation slides. One teacher described that her typical teaching style involved using PowerPoint slides projected from her computer and she had become used to using curricula that already included such slide decks. As DLOD did not include slide decks, if teachers wanted to use them, they needed to make their own. Another teacher explained how she used one computer to project a PDF of the lesson plan and then displayed the digital version of the graphic novel projected from a second computer. She toggled back and forth between computers and found this difficult. Teachers found the extra effort of making slides or projecting multiple different documents cumbersome and thought it would be easier if the DLOD curriculum included slide decks with key images from the graphic novel and discussion questions.

Audio / Video Enrichment Scaffolding

All teachers used the audio enrichment materials though with varied results. Teachers also expressed that there was a variable amount of interest and understanding from their students regarding the musical elements. One teacher explained that she used the soundtrack for one of the lessons, but her class was not deeply engaged with it, and she omitted the second musical lesson. Another teacher shared that she and her class enjoyed using the soundtrack, but she did not think she did it very well and would like to try it again with more scaffolding. She explained:



It was really engaging for kids who have a music background. Different songs went with different pages... we went back to those pages and read it and then listened to the song. And then there was questions like, 'What are you feeling?' Some of my kids really could use it, but I didn't have the [musical] knowledge. I wish there was like [guidance in the curriculum] and then I could teach that.

Regarding the video component, the teachers who used it found it entertaining and engaging for students, but they were not sure how best to incorporate the videos into their teaching. One shared, "I didn't do it because it wasn't in the lesson [plans]; I didn't incorporate it because I was trying to follow the lesson plan guide. But my kids were engaged in it when they saw it at the end."

Teachers' Recommendations for Improvement

RQ 2e: What recommendations for improvement do teachers offer?

Key Findings

- Streamline presentation with classroom-ready slides and materials.
- Provide further scaffolding for teachers' use of audio and video resources.
- Articulate learning standards-aligned learning objectives.

Teachers with whom we spoke offered two recommendations for improvement regarding presentation materials and scaffolding the use of enrichment content.

Streamline Presentation with Classroom-Ready Slides and Materials

Teachers who used a computer to project visual aids during instruction recommended that additional classroom-ready presentation and instructional materials, such as slides that anchor each lesson, be made available for them. They specifically recommended slide decks with the discussion questions, characters' images from key pages, or themed artwork aligned with each lesson. Having these materials, they thought, would have streamlined and simplified their experience in ways that would also help them more deeply engage their students. Another teacher developed her own writing worksheets to accompany the lessons. She recommended developing a set of writing prompts for teachers to use as they teach the lessons because, she thought, teachers with less time may have less opportunities to engage as deeply in the writing process.

Provide Further Scaffolding for Curriculum Extensions

All teachers used the audio and video components, but several indicated a need for more scaffolding to make the most of this curriculum extension. One teacher described



how students with a musical background were highly engaged and seemed to benefit, although those without that background benefited less. Lacking a musical background herself, she had little ability to make the most of the opportunity the soundtrack may have provided. Teachers suggested that author's notes could give teachers more background information and explicit guidance on the music to share with students. These notes, they suggested, could have sentence frames, or use more detailed musical terminology to help students not only experience the story with music, but also develop their musical literacy.

Although the teachers and students who saw the video components enjoyed them, not all teachers knew how to incorporate them. They suggested more detailed information in the lesson plan guide that could provide more information about the video content and suggestions for how to use it in the classroom.

Articulate Learning Standards-Aligned Learning Objectives

The lesson plan guide articulated a topical focus of each lesson but did not provide explicit learning objectives aligned with curriculum standards. When reviewing the lesson plan guide alongside the state's reading standards and classroom observations, we observed many instances of alignment, however this alignment was not articulated in the lesson plan guide. In addition, each lesson included optional writing components and elements of musical appreciation and discussion of visual art, however these standards were also not articulated in the lesson plan guide. Although this was not a salient concern among the teachers we interviewed, through analysis of the curriculum and associated standards, we found that articulating "expected learning outcomes" or "possible learning outcomes" may assist teachers in focusing their use of the curriculum.

DISCUSSION

The purpose of the present study was to examine the implementation and impacts of the Digital Lizards of Doom supplemental literacy program on Grade 3–5 student literacy learning across five schools in San Diego Unified School District. To address exploratory research questions about DLOD students' performance in reading, we used hierarchical linear regression to compare their gains relative to matched-comparison students on FastBridge aReading overall scale scores from winter to spring of the 2024–25 school year. We further conducted parallel analyses on student sub-populations of interest. Additionally, to determine DLOD's potential as an effective supplemental program for enhancing students' interest and engagement in reading, we observed representative classes and interviewed teachers regarding their program experiences and perceptions. Although the quantitative analyses did not show significant program impacts on student reading achievement, teacher observations and interviews revealed generally high engagement in the program by students and positive impressions by teachers of the program's value for students and adaptability as a supplemental reading program.



Achievement Impact

Results of the main impact analyses showed nonsignificant differences between Digital Lizards of Doom and comparison students on both FastBridge aReading overall scores, as well as aReading Lexile Score, aReading and AUTOreading risk levels, and aReading DfLR. Treatment students outgained comparison students by under 1 point, on average, on FastBridge aReading. Subgroup analyses showed patterns of nonsignificant results like those observed in the main impact analysis, except for one key finding. A significant interaction between grade level and treatment showed that students in higher-grade DLOD classes demonstrated significantly higher Lexile Score gains than their comparison-group counterparts. This finding suggests that the curriculum and its classroom activities have potential to enhance reading achievement with older students who have already mastered basic reading skills. Although further research is needed, this finding suggests that older students, having the basic skills for “reading to learn,” are better able than their younger peers to translate DLOD’s immersion in reading, analyzing, and discussing engaging stories into measurable gains on standardized reading assessments.

Program Design Qualities

Without question, the most impactful and revealing results in this study come from our classroom observations and interviews with teachers. From a design perspective, DLOD both incorporates principles of active learning and feedback (Slavin, 2021), while adding a behavioral theory component of reinforcement through advancing levels and activities tracking progress through the graphic novel (Blackburn et al., 2016).

Based on the present results, these features still appear viable from a design perspective while improving student reading outcomes. Specifically, design features were generally supported by teachers and students, especially the components involving novel text presentation, engaging characters, emoticons, rich illustration, and foreshadowing in the story.

Study Design and Measurement Factors

The comparison group was relatively small and was drawn from the same five schools. A larger sample of comparison students may increase the likelihood of finding significant impact results. The inclusion of multiple school districts and assessments focused more on reading comprehension is recommended for follow-up research.



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APPENDIX A: READING STANDARDS

Key Ideas and Details Cluster			
Standard	Grade 3	Grade 4	Grade 5
1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
2	Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text	Determine a theme of a story, drama, or poem from details in the text; summarize the text.	Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.
3	Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.	Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).	Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).

Craft and structure Cluster			
Standard	Grade 3	Grade 4	Grade 5
4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.	Explain how a series of chapters, scenes, or stanzas fit together to provide the overall structure of a particular story, drama, or poem.
5	Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.	Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology.	Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.
6	Distinguish their own point of view from that of the narrator or those of the characters.	Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.	Describe how a narrator's or speaker's point of view influences how events are described.



Standard	Integration of Knowledge and Ideas Cluster		
	Grade 3	Grade 4	Grade 5
7	Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting)	Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text	Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).
8	(Not applicable to literature)	(Not applicable to literature)	(Not applicable to literature)
9	Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series).	Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.	Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.



APPENDIX B: DLOD TEACHER INTERVIEW PROTOCOL

Position

1. What grade and in what school did you teach this year?
2. How long have you been teaching in this school?
3. How long have you been teaching all together?

Using Digital Lizards of Doom (DLOD)

4. When did you first hear of the book series and curriculum materials?
5. What did you hear?
6. Why did you decide to use it?
7. How would you compare it to other book and lesson series?
8. How did you use the lesson guide in the curriculum
9. How did you modify the use of curriculum to meet your students' learning needs?

Improving the DLOD Curriculum

11. Speaking first about book itself, did you continue with your class beyond the first book?
12. As far as you know, did any of your students catch an interest and continue with book series beyond what you did in class?
13. Did you and your students use the video component, along with the book's series? How? Describe.
14. Did you and your students use the musical component?
15. What changes would you suggest to improve the curriculum?
16. Would you use the book series again in the future?



APPENDIX C: EQUIVALENCE FOR FULL SAMPLE

Table C1
Baseline Equivalence for Full Sample

Full Sample	All students <i>n</i>	<i>n</i>	Treatment <i>M</i>	<i>SD</i>	<i>n</i>	Comparison <i>M</i>	<i>SD</i>	Treatment-Comparison Difference <i>M</i>
FastBridge Pretest (Winter) aReading Score	427	315	517.89	25.24	112	512.98	25.25	0.194
Grade	427	315	4.23	0.84	112	3.69	0.94	0.611
Gender	427	315	0.49	0.50	112	0.47	0.50	0.030
Minority Status	427	315	0.41	0.49	112	0.35	0.48	0.120
English Learner Status	427	315	0.05	0.23	112	0.06	0.24	0.036
LEP Status	427	315	0.16	0.36	112	0.21	0.41	0.151



APPENDIX D: IMPACT ANALYSES

Table D1

Impact Analysis of DLOD on Spring 2025 FastBridge aReading Overall Scale Scores

Variable	B	SE	t	df	p Value	CI Low	CI High
(Intercept)	189.512***	14.843	12.768	379	0.000	160.327	218.697
Treatment	0.102	1.554	0.0658	379	0.948	-2.954	3.158
Winter aReading Score	0.622***	0.030	20.819	379	0.000	0.563	0.681
Gender	-0.518	1.166	-0.444	379	0.657	-2.810	1.775
Grade	2.981***	0.770	3.871	379	0.000	1.467	4.495
Minority Status	1.954	1.203	1.624	379	0.105	-0.411	4.320
Students with Disability Status	-7.571***	1.865	-4.059	379	0.000	-11.239	-3.903
English Learner Status	-8.616***	2.827	-3.048	379	0.002	-14.174	-3.058
Parent Education	1.569*	0.667	2.350	379	0.019	0.256	2.881
School	-0.719	0.441	-1.632	379	0.104	-1.585	0.147

Note. *** $p < .001$, * $p < .05$.

Table D2

Impact Analysis of DLOD on Spring 2025 FastBridge aReading Lexile Scores

Variable	β	SE	t	df	p Value	CI Low	CI High
(Intercept)	185.677***	56.616	3.280	20.540	0.004	67.776	303.578
Treatment	-8.224	22.046	-0.373	13.018	0.715	-55.844	39.396
Winter aReading Lexile Score	0.772***	0.030	25.409	375.486	0.000	0.712	0.832
Gender	-1.686	15.374	-0.110	373.585	0.913	-31.916	28.544
Grade	20.785	11.263	1.846	17.120	0.082	-2.964	44.534
Minority Status	32.070*	15.937	2.012	375.934	0.045	0.734	63.407
Students with Disability Status	-66.846**	25.224	-2.651	375.856	0.008	-116.444	-17.248
English Learner Status	-90.454*	37.979	-2.382	375.907	0.018	-165.131	-15.776
Parent Education	20.767*	8.837	2.350	375.968	0.019	3.391	38.142
School	-8.256	6.306	-1.309	11.021	0.217	-22.131	5.619

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

**Table D3***Impact Analysis of DLOD on Spring 2025 FastBridge aReading Risk Level*

Variable	β	SE	<i>t</i>	<i>df</i>	<i>p</i> Value	CI Low	CI High
(Intercept)	0.752***	0.195	3.863	379	0.000	0.369	1.135
Treatment	-0.022	0.070	-0.305	379	0.760	-0.160	0.117
Winter aReading Risk Level Score	0.687***	0.033	20.624	379	0.000	0.621	0.752
Gender	-0.056	0.052	-1.070	379	0.285	-0.159	0.047
Grade	-0.027	0.032	-0.834	379	0.405	-0.091	0.037
Minority Status	0.067	0.054	1.230	379	0.219	-0.040	0.174
Students with Disability Status	-0.293**	0.088	-3.335	379	0.001	-0.466	-0.120
English Learner Status	-0.139	0.126	-1.105	379	0.270	-0.386	0.108
Parent Education	0.083**	0.030	2.720	379	0.007	0.023	0.142
School	-0.009	0.020	-0.467	379	0.641	-0.049	0.030

Note. *** $p < .001$, ** $p < .01$.

Table D4*Impact Analysis of DLOD on Spring 2025 FastBridge AUTOreading Risk Level*

Variable	β	SE	<i>t</i>	<i>df</i>	<i>p</i> Value	CI Low	CI High
(Intercept)	1.104**	0.343	3.221	244	0.001	0.429	1.779
Treatment	-0.111	0.097	-1.146	244	0.253	-0.302	0.080
Winter AUTOreading Risk Level Score	0.600***	0.055	10.905	244	0.000	0.491	0.708
Gender	0.049	0.049	0.984	244	0.326	-0.049	0.146
Grade	-0.068	0.061	-1.117	244	0.265	-0.189	0.052
Minority Status	-0.010	0.051	-0.187	244	0.851	-0.110	0.091
Students with Disability Status	-0.136	0.075	-1.816	244	0.071	-0.283	0.011
English Learner Status	-0.170	0.112	-1.514	244	0.131	-0.392	0.051
Parent Education	0.025	0.026	0.960	244	0.338	-0.026	0.076
School	-0.006	0.021	-0.307	244	0.759	-0.047	0.035

Note. *** $p < .001$, ** $p < .01$.

**Table D5***Impact Analysis of DLOD on Spring 2025 FastBridge DfLR*

Variable	β	SE	<i>t</i>	<i>df</i>	<i>p</i> Value	CI Low	CI High
(Intercept)	4.110	4.046	1.016	379	0.310	-3.845	12.065
Treatment	-0.001	1.555	-0.001	379	0.999	-3.060	3.057
Winter aReading DfLR	0.623***	0.030	20.794	379	0.000	0.564	0.681
Gender	-0.463	1.167	-0.397	379	0.691	-2.758	1.831
Grade	0.398	0.722	0.552	379	0.581	-1.021	1.818
Minority Status	1.992	1.204	1.655	379	0.099	-0.375	4.360
Students with Disability Status	-7.584***	1.868	-4.059	379	0.000	-11.258	-3.911
English Learner Status	-8.622**	2.831	-3.046	379	0.002	-14.188	-3.057
Parent Education	1.570*	0.668	2.349	379	0.019	0.256	2.883
School	-0.767	0.442	-1.738	379	0.083	-1.635	0.101

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.