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Examining Enactments of Project-based Learning in Secondary English Language Arts

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Project-based learning (PBL) grounds instruction in authentic learning experiences where students engage in real-world explorations that culminate in a final product or performance. We report on a mixed methods study with 43 ninth-grade English language arts (ELA) teachers (22 PBL and 21 comparison) and 1,671 students exploring the feasibility of enacting PBL in ELA classrooms and examining how teachers and students perceived this approach to learning. PBL teachers enacted PBL design principles significantly more than comparison teachers. The majority of PBL teachers perceived positive instructional shifts including more student-centered and authentic learning, more student choice, and greater student engagement. Many teachers also expressed a sense of renewal and passion. Students in PBL classrooms reported more meaningful learning experiences, opportunities for collaboration, and other aspects of social and emotional learning. We discuss tensions, including the challenge of covering required content and skills within a PBL-focused classroom.

Keywords: *authenticity, collaboration, English language arts, high schools, learning environments, mixed methods, project-based learning*

Introduction

Project-based learning (PBL) grounds instruction in authentic learning experiences where students engage in real-world explorations that culminate in final products or performances. In the United States, the first PBL movement took place during the progressive era (e.g., Dewey, 1916). Despite indications of effectiveness (Aikin, 1942; Cremin, 1961), PBL never became widespread. Some have argued this is because of cultural and implementation issues, such as that PBL does not fit easily into the typical "grammar" of

schooling (Tyack & Tobin, 1994), especially in secondary schools. Others argue it does not fit common beliefs among teachers, administrators, and parents about what constitutes rigorous teaching and learning (Cuban, 1984; Polman, 2000). PBL gained popularity again in the 1990s (e.g. Meier, 1995; Pea et al., 1997), but the current resurgence began in the 21st century's second decade (Baines et al., 2021; Condliffe et al., 2017; Grossman et al., 2019; High Quality Project Based Learning, 2018) and continues into the present. Whereas most prior PBL was focused in science classrooms (Blumenfeld et al, 1991; Krajcik et al., 1998; Polman, 2000), with some in history education (e.g., Levstik & Barton, 1997), PBL now spans multiple disciplines and subject matter and is increasingly concerned with serving equity aims. We are among those exploring PBL or inquiry-based learning approaches in English language arts (ELA). We do not yet know if the current PBL wave will crest, but research is needed to understand how feasible it is to enact across disciplines and grade levels.

We report on a quasi-experimental mixed methods study exploring the feasibility of enacting PBL in secondary ELA and examining how teachers and students perceived this approach. We asked:

1. How do ninth-grade ELA teachers who have been part of a PBL professional learning model enact PBL relative to instruction in comparison classrooms?
2. How do teachers experience enacted PBL in ELA relative to teachers in comparison classrooms?
3. How do students experience enacted PBL in ELA relative to students in comparison classrooms?

Literature Review and Framing

Prior PBL in ELA research and development has occurred at the elementary level (e.g., Duke et al., 2016; Halvorsen et al., 2012; Parsons et al., 2011) and to a lesser extent at secondary levels (e.g., Baş, 2011; Spires et al., 2021). Adjacent approaches in secondary ELA can also be found within inquiry-based English education (e.g., Beach & Myers, 2001), critical literacy (e.g., Vasquez et al., 2019; Yoon et al., 2018), digital literacies (e.g., Spires et al., 2021), and multimodal literacy framings (e.g., Smith, 2014), in which students take up different forms of critical sense-making, culturally sustaining connections, and social action through inquiry-based experiences.

In a meta-analysis of studies comparing PBL to typical instruction, Chen and Yang (2019) looked at 30 studies from elementary to college level, including six studies in humanities (English, history, French, and geography). They found a moderate to large overall positive effect size of PBL for academic outcomes; the effect size was larger in humanities than in math and science. For instance, a study of 60 ninth-grade students in Turkey showed that students doing PBL for five weeks had significantly higher positive attitudes toward learning and higher end-of-unit ELA exam scores than students receiving typical instruction (Baş, 2011). Hernández-Ramos and De la Paz (2009) found similar results in social studies comparing 170 eighth-grade students in two U.S. schools, one group engaging in a six-week technology-enhanced PBL unit and the other receiving typical instruction. PBL students had higher content knowledge scores, demonstrated higher levels of historical thinking, and reported increased positive attitudes toward learning social studies and working with others. Students also reported enjoying PBL experiences and learning skills they could apply in the future. Both teachers and students noted the benefits of presenting final projects to various authentic audiences. In another study of 27 ninth graders, Himes et al. (2023) reported that a project-based inquiry approach (PBI Global) enacted in an online learning environment during the COVID pandemic facilitated student-centered learning about global issues and increased students' skills at collaboration. Teachers also reported feeling more efficacious at using an inquiry approach in ELA. Others found that students in Advanced Placement (AP) history classes had higher rates of passing the AP exam compared to students receiving typical instruction (Parker et al., 2013; Saavedra et al., 2021). In one study of AP history, teachers and students reported that PBL was more engaging than typical school, and students particularly noted positive benefits of group work, civic engagement, and exam preparation (Saavedra et al., 2021).

Based on a review of the theoretical, empirical, and practical literature on PBL (cited previously, as well as Drain, 2010; Parker et al., 2013; Polman, 2012), we and collaborating researchers and educators developed the principles shown in Table 1 to articulate key features of rigorous PBL in English language arts (Boardman et al., 2021). In addition to the design principles in the table, Universal Design for Learning (UDL) informed our curriculum design and enactment within PBL classrooms to ensure inclusive learning (Gordon et al., 2012; Rose & Meyer, 2002). UDL aims to make learning accessible to all students by designing flexible and adaptable curriculum materials and teaching strategies. Through the use of multiple means of representation, expression, and engagement, students have options for accessing information, expressing their understanding, and engaging with content (CAST, 2024). In line with UDL, we anticipated and planned for potential barriers to learning in the design of materials and addressed them in professional learning and coaching.

Authentic Making

Our authentic making PBL principle refers to instructional practices that begin with a question or challenge that drives student inquiry across multi-week project work.

TABLE 1
Compose Our World Design Principles

Design Principle	Description
Authentic Making	Students create products for audiences other than their teachers that are challenge driven and authentic to themselves, to others, and to the tools and practices of professionals.
Social and Emotional Learning (SEL)	Collaboration: Students work together by sharing and acknowledging ideas, giving and getting feedback, discussing, and creating products.
	Caring/advocacy/perspective taking/empathy: Students and teachers engage in learning activities and classroom experiences that recognize and value each other as individuals and as part of a classroom community.
Iterative Design Cycles	Feedback/revision: Teachers and students give feedback, using protocols to support revision of student work.
	Reflection: Students have opportunities to reflect on classwork processes, goals, thoughts, and feelings.

Questions or challenges provide coherence (Penuel & Gallagher, 2009) to activities leading toward authentic culminating products or performances.

Our understanding of authenticity in PBL is based on Shaffer and Resnick's (1999) notion of "thick authenticity" and Polman's (2012) argument that three kinds of authenticity contribute to fostering engagement and cognitive learning. These kinds of authenticity, from the perspective of learners, are the degree to which a project is authentic to self, authentic to others, and uses authentic tools—the materials, technology, and practices used by experts or professionals. When a project is authentic, it connects to individuals' emotions and identities to build engagement (Polman et al., 2018). Sometimes this manifests as projects connecting to students' enduring interests in topics or participation in practices (Azevedo, 2011). Authenticity to self may also mean that projects connect to students' identities or to the kinds of people they want to be now and in the future (Wortham, 2004). A key component of personalized authenticity involves students making choices in relation to what they learn (e.g., the unique topic of a project within an essential question like "What makes people human?") and how they move through learning processes (e.g., how much visual versus verbal expression students integrate into multimodal products). Educators create parameters within which students have the agency to make learning meaningful to them.

When projects are authentic to others, students see individuals and community audiences who care about the product or performance (Beach & Myers, 2001). Sharing with audiences drives toward end goals, but students may engage with experts along the way (Polman et al., 2018), animating processes and products while making classrooms more connected to the outside world. Finally, when a project uses authentic tools, it may draw on both tools of disciplines associated with a product (e.g., interviewing techniques, video production software) and the cultural tools of learners themselves (e.g., publishing via TikTok or other social media; Smagorinsky & Coppock, 1994; Vygotsky, 1978; Wertsch, 1998). In ELA, literacy tools include writing, multimodal composing, and designing in particular genres and expressive forms (Bakhtin, 1981) used in everyday life and in professional worlds. Research in ELA—both with PBL and more generally—has shown that personal, cultural, and expressive authenticity engages more diverse learners while deepening ELA learning (e.g., Luke, 2014; Moje et al., 2020; Vasquez et al., 2019); for instance, Lee (2001) stressed building on everyday cultural practices to cultivate meaningful use of literary analysis techniques for textual sensemaking, while Behizadeh (2014) emphasized the importance of grounding writing and expressive tasks in the life-worlds of students and writing to impact an intended, actual audience.

Social and Emotional Learning

Our PBL social and emotional learning (SEL) design principle includes two aspects: 1) collaboration and 2) caring, advocacy, perspective taking, and empathy ("CAPE").

Rich forms of collaboration have the potential to elevate literacy learning in general (e.g., Applebee et al., 2003) and to support the entire PBL process. As educational standards have moved toward college and career readiness and "21st-century skills," collaboration has become a universal goal for literacy instruction (e.g., Chandler-Olcott & Hinchman, 2019; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2020). In addition, collaboration supports SEL within content area learning through relationship building, self-management, and responsible decision-making (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2022; Jagers et al., 2019). Collaboration is the one principle explicitly mentioned in the Common Core State Standards (NGAC & CCSSO, 2020). In ELA PBL, collaborative talk among students functions like conversations that happen outside school, enabling the choice, agency, and accountability that are critical to carrying out production and learning in PBL projects.

We expand beyond collaboration to address four critical aspects of equity-oriented SEL: caring, advocacy, perspective taking, and empathy (CAPE, Garcia et al., 2021). We

center care as a value in how teachers and students treat one another and can expect to be treated in classrooms. We see caring as collective tending to emotions, where emotions are recognized and valued by self and others. This requires relationships among students and teachers based on mutual trust, respect, and acknowledging power. Thus, care is both affective and political (Ahmed, 2015), and as such, it is important that students are able to advocate for themselves and others. Advocacy is important because some individuals and communities experience injustice that should not be accepted and must be countered (Valenzuela, 1999). Caring and advocacy work requires mutual trust and deep listening and is facilitated by perspective-taking and empathy. Perspective-taking enables teachers and students to explore and make sense of others' actions and motivations. Empathy enables classroom community members to connect with others' feelings. Not only students but also teachers deserve care and healing (Garcia, 2019). We encourage teachers to model expectations of respect and empathy in their classrooms while structuring opportunities for students to enact CAPE (Garcia et al., 2021). Our notion of CAPE fits into wider considerations of caring relationality and trauma-informed pedagogy in literacy education (e.g., Dutro, 2019) as well as activism and restorying (e.g., Thomas & Stornaiuolo, 2016).

Iterative Cycles of Feedback, Revision, and Reflection

Research has found that supporting students across disciplines in identifying criteria, pitching and drafting ideas with peers, engaging in cycles of feedback and revision, and then reflecting across the process can build and deepen student learning (e.g., English & Kitsantas, 2013; Grossman et al., 2019; Polman, 2000, 2004).

Feedback supports students in developing an understanding of how to build and refine disciplinary content and skills (e.g., Butler & Winne, 1995). In PBL, feedback is an essential part of student production as students learn to communicate using disciplinary discourses and evaluate their use of authentic tools and practices (Larmer et al., 2015).

Revision in ELA often refers to processes of improving or enhancing written products by refining language, structure, and clarity (Gallagher, 2011), such as in writer's workshop approaches (e.g., Hicks, 2009). As composition has become increasingly multimodal, revision has similarly expanded to address how modes and media can best achieve rhetorical and expressive goals (Smith, 2014). Three key components of revision in PBL include students (1) pitching ideas to one another with opportunities to revise thinking, (2) engaging in several rounds of feedback and revision of a final product, and (3) reflecting on how revisions worked and planning for future projects.

Reflection has been used to describe multifaceted aspects of studying the self (Costa & Kallick, 2009; Schön, 1982). Examining feelings in reflective processes can also support students in SEL (CASEL, 2022; Fitzgerald, 2020; Jagers et al., 2019) and in developing a sense of projects being authentic (Boardman et al., 2021). In ELA, reflection involves both (1) self-examination processes where students reflect on their thoughts and feelings about topics and themselves (Beach, 2012) and (2) ways for students to become metacognitive about processes they go through in developing knowledge (Bruer, 1993).

Tensions Within Our Design Principles

Design principles were the conceptual and practical guideposts in our design work, professional learning, coaching support for teachers, and data analysis. We recognize that each principle carries tensions in how educators conceptualize, enact, and respond to realities in different schools and classrooms. In many ways, these tensions are drivers for our research questions related to the possibilities of PBL in ELA. Some of these tensions emerged in our analysis and are reported in the results and discussion sections. Others are discussed elsewhere (see DeBarger & Chun, 2017; Potvin et al., 2021).

Methods

Context and Participants

Compose Our World is a project-based learning approach to ninth-grade English language arts, designed to be implemented with one project per quarter across a school year. Over a five-year period, a team of researchers and educators worked together to develop and study the curriculum along with professional development (PD) supports, including design institutes, to learn about PBL and classroom projects, individual and group coaching, and teacher and student-facing materials. The authors are university faculty and doctoral students, bringing unique experiences in English language arts, project-based learning, coaching, and Universal Design for Learning. All materials are open education resources. Table 2 shows an overview of the four projects. We report on a mixed methods study from the project's fourth year (2018–19).

Teacher Participants. We partnered with 17 high schools in two U.S. states, one in the Rocky Mountain region and one in the Midwest, ranging from rural to midsize city locations in five districts (National Center for Education Statistics [NCES], 2021; Table 3). Districts interested in PBL were recruited via word-of-mouth with consideration to working with schools and districts with varying contexts. Per the request of districts, we first recruited ninth-grade ELA teachers to participate in PBL PD and to implement the curriculum (PBL group). We then recruited teachers willing to participate in a business-as-usual comparison group (COMP group). Teachers in both groups consented to participate,

TABLE 2
Overview of Compose Our World PBL Projects

Name of Project	Project Challenge—Overview	Final Product
Remix Our World	*How is the world composed for us, and how do we compose our world?* Students use a critical literacy perspective to explore text in relation to purpose, perspective, and audience.	Creative individual remix
What Happened Here	*What happened here?* Students examine how perspective and audience shape the stories we tell about ourselves and our communities.	Narrated digital photo story
Unearthing Humanity	*What does it mean to be human?* Students explore the meaning of humanity, gathering evidence to identify and support their claims.	Interactive museum exhibit
Changing the Conversation	*How can we change the conversation about issues that are important to us?* Teams conduct research and design public service announcements.	Multimodal media campaign

Curriculum materials are available as open educational resources at https://sprocket.educurious.org/home/curriculum/9th-grade-ela.

TABLE 3
Schools and Districts in PBL and Comparison (COMP) Groups

			Teachers*		Students	
District	District Size	High Schools	PBL	COMP	PBL	COMP
State A						
1	Midsize city/suburb	3	5	4	150	154
2	Suburb	1	2	0	120	0
State B						
3	Small city/suburb/rural	11	14	14	364	392
4	Town	1	0	1	0	7
5	Rural	1	1	2	96	24
Total *N*		17	22	21	730	577
				Total *N*	1307	

*Note some teachers taught multiple sections. See NCES (2021) for geographic designations.

adhering to protocols approved by university and school district Institutional Review Boards. All teachers received stipends to compensate for their time. The final sample included 43 teachers: 22 PBL teachers with 4 to 26 years of teaching experience ($M = 13.6$; $SD = 6.4$) and 21 COMP teachers with 1 to 34 years of teaching experience ($M = 14.6$; $SD = 7.3$). PBL and COMP teachers appeared similar in terms of demographic characteristics and instructional approaches on a variety of indicators, enacting a range of literature-focused and inquiry approaches. Sixty-eight percent of teachers identified as female. One teacher identified as Black, one as Indigenous, and the remaining teachers identified as white.

Student Participants. The study began with 1,671 ninth-grade students who consented to participate (Table 4). The final data set for all quantitative analysis includes 1,307 students, representing 78.2% retention. Of 364 students dropped from beginning enrollment in the study to analysis, 102 (~6% of the original sample) switched conditions (PBL to COMP or vice versa) and were dropped from the analysis. Another 191 students (~11%) did not have complete administrative data from school districts and thus could not appear in all analyses. The remaining 71 students (~4%) transferred schools or to a teacher outside the study. Because the study was conducted across the school year, the sample size varies for any given data source. Table 4 shows that PBL students tended to attend schools with higher proportions of students who qualified for free-and-reduced-price lunch, were students of color, and were more likely to have lower prior math and ELA test scores. The regression model analyses reported later in the article seek to control for effects these and other factors may have had on reported outcomes.

Teacher Support. PBL teachers participated in four days of in-person upfront PD in late summer in a central location by state, introducing them to PBL, course design principles, and the first project. In addition, they attended one day of in-person PD before teaching each of the remaining three projects (seven days total across the year). Teachers were

TABLE 4
High School and Student Demographic Means (SDs) by Group

	PBL	COMP
School		
Enrollment*	1091.63 (592)	1282 (729)
% Free-and-reduced-price lunch*	47 (26)	32 (25)
% White*	60 (27)	72 (28)
% English-language-learner (ELL)*	1 (3)	<1 (<1)
Student		
Age*	15 (1)	15 (1)
% White*	64 (467)	76 (439)
% Receives Special Education Services (SPED)	5 (40)	5 (27)
% English language learner	2 (14)	1 (3)
% Free-and-reduced-price lunch*	53 (388)	34 (197)
% Low prior math*	19 (136)	12 (69)
% Low prior ELA*	25 (184)	11 (65)
N	730	577
Total *N* = 1307		

Note: *Indicates differences are statistically significant at $p < 0.01$; *N* includes only students for whom demographic data were available. All data are from 2018–19.

also offered virtual individual coaching support and group cohort sessions of 6—8 teachers, approximately 90 minutes each month. Attendance was near 100% for full-day PDs. Cohort group and individual coaching participation varied from 100% to 30%, with participation lowest during vacations and decreasing gradually in the second semester. At the study's conclusion, COMP teachers were also offered PBL PD and access to curriculum materials.

Teacher Measures

Classroom Enactment. Classroom enactment measures captured elements of PBL from the Compose Our World design principles as they were represented in PBL and COMP classrooms. The primary data source for classroom enactment was the observation protocol, scored in person by trained observers during one full class session four times in PBL classrooms and twice in COMP classrooms (see Appendix A1). A minimum threshold of observation visits was used to capture instruction (Bell et al., 2019; Cohen & Goldhaber, 2016). Observers visited one day within each three-day observation cycle. We trained observers by reviewing observation procedures and scoring criteria, practice scoring with discussion, and double scoring 15% of observations in each observation window to confirm scoring consistency (Bell et al, 2012). All items were scored on a scale of one (low) to four (high). The UDL subscale was dropped for final analysis because the reliability coefficient was below the accepted threshold of .70. The remaining subscales had an acceptable average Chronbach's alpha reliability coefficient of .92 (range: .71–.95).

To triangulate across data sources, observers recorded field notes in a template aligned to each section of the observation protocol and observations were supplemented with teacher self-report of instruction on an instructional log (see Appendix A2). After attending a scoring training session, teachers in both study groups were asked to complete logs for three days in a row within three observation cycles for a possible nine logs per teacher. The return rate for online instructional logs was 89% for PBL teachers and 79% for COMP teachers.

Teacher Perceptions. PBL and COMP teachers were interviewed at the academic year end using structured interview protocols (see Appendix A3). PBL teacher interviews lasted 45–60 minutes and included 14 questions. Comparison teacher interviews lasted approximately 15 minutes with 10 questions. All teachers were asked a set of common questions, for instance, about teachers' experiences at their schools (e.g., Tell me about your school.) and about instruction (e.g., Is there a standard or skill you feel that students met well this year and why?) to compare response patterns across groups. PBL teachers were asked additional questions related to Compose Our World experiences.

Student Measures

Student measures focused on authentic making and SEL design principles. We triangulated findings by aligning items on our framework elements across measures.

We developed the PBL Student Survey to capture student perceptions of authenticity and SEL collaboration (see Appendix A4). To gather an understanding of each item, 12 students with varying learning and language profiles participated in a think-aloud protocol with a research team member while taking the survey. Questions were revised as needed and the survey was given to a larger sample of students. Reliability was established at acceptable levels (authenticity, $\alpha = .89$; collaboration, $\alpha = .96$). The PBL Student Survey was administered to all students three times throughout the academic year, beginning after teachers' initial professional learning activities (mid-fall, winter, and spring). The survey consisted of authenticity items (e.g., We do things in class that are interesting to me.), and items to establish the frequency and quality of experience (e.g., I learned from others in my group) of both short-term and extended collaboration. Response formats included Likert items from 1 (never) to 4 (always), checklist (yes/no), and check all that apply inventories.

As an additional SEL measure, students responded to several sections of the Panorama Student Survey (Panorama Education, 2015). We selected five subscales that aligned with the PBL curriculum: classroom engagement, classroom

belonging, student-teacher relationships, social awareness, and effort. Each student responded to the 28 multiple-choice items included in the tool once in the spring. However, a recent report on the validity and reliability of the Panorama (published after we had selected the survey for our study) outlined the need for more research to "disentangle school effects from classroom or teacher effects," suggesting the survey may measure students' overall school experiences rather than individual classroom experiences (Gehlbach & Hough, 2018, p. 20).

Analytic Approach

To compare enactment across PBL and COMP classrooms, we used independent-sample t-tests of observation protocol and instructional log scores, along with qualitative data from observation field notes. We identified statistically significant differences in each observation protocol subscore and triangulated these differences with field notes and instructional log data to provide robust descriptions of differences in the enactment of PBL principles. We then rank-ordered all teachers into four quartiles (11 teachers in each quartile) to determine how PBL instruction varied and was distributed within and across PBL and COMP classrooms.

To identify differences in student experiences between PBL and COMP curricula, we conducted an analysis using a series of logistic and linear regression equations taking the general form of

$$Y_{ij} = \beta X + \varepsilon$$

Where Y_{ij} is the outcome variable of interest for student i in school j (e.g., student opportunities to engage in collaboration activities and student scores on the authenticity and collaboration survey), X represents the matrix of control variables listed in Table 4 as well as an indicator for exposure to PBL curriculum, and β indicates the matrix of covariate estimates.

Due to recruiting requirements set by our district partners, there is potential bias from teachers self-selecting into either the PBL or business-as-usual groups. Our analytic approach was to control for sources of selection bias and differences among students that may have influenced classroom experiences.

To compare the experiences of PBL teachers relative to COMP teachers, we used qualitative analysis (Miles et al., 2018) to code and identify themes from teacher interviews (see Appendix B). Researchers segmented transcripts (21 PBL and 21 COMP) into talk turns and coded deductively (i.e., PBL design principles) and inductively. We discussed and refined initial codes with a subgroup of the author team. We collapsed codes into themes and tallied them by occurrence. To inform the findings reported here, we created analytic memos (Miles et al., 2018) for each theme, discussed them, triangulated them with existing data sources, and refined them for accuracy.

Academic outcomes are beyond the scope of this paper, but we found no significant differences between student outcomes in PBL classrooms and comparison classrooms on a measure of academic writing (Boardman & Polman, 2019).

Findings

Teacher Enactment

Overall, the majority of PBL teachers taught all four PBL projects. Enactment dropped somewhat across the year (project 1: 100%, project 2: 96%, project 3: 87%, project 4: 78%). Table 5 shows enactment patterns, specifically average observation scores across occasions by group, aligned to project design principles—authentic making, social and emotional learning (including collaboration and CAPE), and iterative design cycles—as well as a general teaching measure. With the exception of the general teaching subscale, PBL teachers received higher scores ($p < .05$) on each subscale and overall. General teaching items addressing the organization of classrooms and instruction did not vary across groups, indicating similar overall quality of general instruction across teacher groups. Thus, our measures of the presence and quality of PBL instruction demonstrate that teachers who participated in PBL professional learning enacted design principles to a greater extent than comparison teachers.

Figure 1 shows the range in enactment across teachers within and across groups by arranging teachers into quartiles. Observation protocol scores for PBL and COMP teachers ranged from 36 to 95 (possible range 30–120). Nine PBL teachers and two COMP teachers were in the highest quartile of PBL enactment, showing that several indicators of high-quality PBL occurred in some comparison classrooms with teachers who had not participated in our PD. In these comparison classrooms, the highest scores were in areas of SEL though these COMP teachers had relatively high scores in authentic making as well. Seven teachers who participated in our PBL PD (30% of our PBL teachers) and 15 COMP teachers (71% of COMP teachers) fell in the bottom two quartiles of PBL instructional enactment, indicating that not all teachers in the PBL group took up PBL practices to the same extent. Notably, five of the seven PBL teachers with the lowest enactment taught in the same school, suggesting that school factors may have influenced their enactment.

Teachers' self-reported instructional log data are consistent with researchers' observations and emphasize features of the learning environment teachers fostered in PBL classrooms (see Table 6). PBL teachers reported engaging in significantly higher levels of design principles than COMP teachers, including increased aspects of authentic making (i.e., authentic audience and tools), SEL (i.e., collaborating

TABLE 5
Teacher Mean (SD) Observation Protocol Scores by Subscale by Group Averaged Across Occasions

Observation Protocol Subscale	PBL M (*SD*)	COMP M (*SD*)	*p*-value
Authentic making	2.73 (0.60)	1.99 (0.62)	<0.01**
Social and emotional learning			
Collaboration	2.49 (1.08)	2.00 (0.99)	0.01*
CAPE	2.68 (0.83)	2.15 (0.79)	<0.01**
Iterative Design Cycles			
Reflection	1.58 (0.82)	1.33 (0.54)	0.04*
Feedback/revision	2.00 (0.68)	1.67 (0.51)	<0.01**
General	3.08 (0.65)	3.10 (0.56)	0.86
Total	2.52 (0.56)	2.11 (0.46)	<0.01**
N	92	42	

Note: Teachers were rated on a scale of 1 = low to 4 = high. PBL teachers were observed four times and COMP teachers were observed two times. *Statistically significant at $p < .05$; **Statistically significant at $p < .01$.
CAPE = caring, advocacy, perspective taking, empathy.

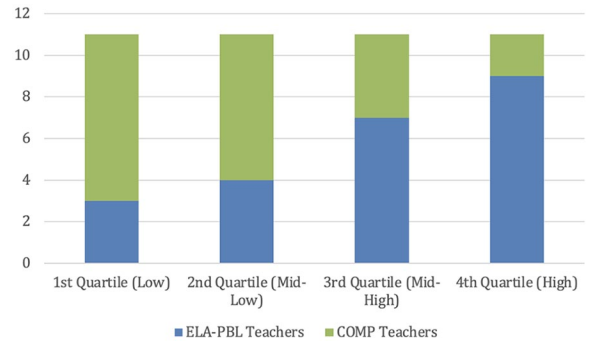

FIGURE 1. *PBL and COMP teacher enactment of PBL design principles.*

and showing a variety of perspectives), and iterative design (i.e., reflection and feedback). Some responses related to participation indicated that PBL teachers and their students were adjusting to instructional shifts. For instance, PBL teachers reported lower student participation levels and engagement and relatively lower levels of students knowing what they were supposed to do throughout class.

Analysis of end-of-year teacher interviews revealed consistent patterns differentiating PBL teachers' experiences relative to teachers who conducted their classes in the usual fashion.

Instructional Shifts. Many PBL teachers referenced instructional shifts that were not mentioned by COMP teachers. The specific differences align with project-based norms (see Compose Our World design principles in Table 1). PBL teachers consistently described that they were not lecturing as much as previously, and their classrooms had become more student-centered. They frequently noted that the Compose Our World PBL approach enabled them to deepen relationships with students, to more quickly recognize students' needs, and to be more inclined to trust students to complete work. Some PBL teachers also commented upon shifts in student creativity, which several saw as being facilitated by students having greater choices to work on personally authentic topics. Teachers also saw their students doing more project management than prior to Compose Our World. For many early career PBL teachers, giving students choice and freedom was new; they explained feeling surprised by how students rose to meet their new expectations. One teacher noted, "Sometimes I was surprised by their insightfulness for such young people."

The most commonly mentioned instructional shifts by PBL teachers were what constitutes an English curriculum and moving to a more student-centered learning environment. One teacher synthesized the feeling of curricular shifts as follows:

> It doesn't have to just be this narrow focus on reading a short story and taking a quiz or doing something creative after it. Like being okay with kids talking. I'm always worried that the minute I walk away, that they're not going to be talking about what they're supposed to be. . . . But I've noticed this year that they are. They care about their education. They care what they're doing. I think that's like relinquishing control a little bit.

Several other PBL teachers expressed shifts in their perceptions of what students were capable of as they adjusted their roles toward intentional facilitation, including relinquishing typical authoritative teacher control. As one teacher shared when describing what felt new in PBL, "Allowing them to discuss things and have ideas. And, to argue their own ideas . . . to be able to express them and try to come to some conclusion on their own."

TABLE 6.
Mean Percentages of Teachers Reporting Affirmatively on the Teacher Instructional Log

Instructional Log Items	PBL % YES	COMP % YES	*p*-Value
Authentic Making Items			
Was a **product** made/written/composed?	0.74	0.68	0.20
Were the students working on something today for an **audience** other than yourself?	0.62	0.20	0.00**
Students **present** information on student work.	0.28	0.22	0.19
Students used **tools authentic** to the work of a person doing that role or job.	0.39	0.21	0.00**
Did students interact with an outside **expert**?	0.06	0.03	0.25
Social and Emotional Learning Items			
Class activities involved **collaboration among students**.	0.73	0.52	0.00**
Collaboration was productive.	0.87	0.93	0.14
Students showed **respect** for each other's ideas, opinions, and backgrounds.	0.94	0.97	0.24
Students showed a variety of **perspectives**.	0.71	0.58	0.01*
Iterative Design Items			
Students gave **feedback** today.	0.71	0.63	0.12
Did students give **feedback to one another**?	0.53	0.30	0.00**
Did students engage in **reflection** activities today?	0.49	0.34	0.00**
Participation Items			
Today in class all students were **engaged** and participated for the majority of the lesson.	0.83	0.97	0.00**
Students seemed to **know what they were supposed to do** throughout class.	0.93	0.99	0.01*
Lesson **includes all students** in learning.	0.91	0.96	0.08
Total logs	184	150	

Note: Teachers were asked to complete 9 logs across the year, each for 3 days in a row—fall, winter, spring.
*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

Engagement. When asked about successes, PBL and COMP teachers alike tended to talk about projects or units that sought to be "relevant" and "fun or engaging." However, teachers enacting PBL offered a wider variety of reasons for project success. Tellingly, PBL teachers discussed authenticity for themselves and students twice as often as COMP teachers. These teachers also represented an expanded notion of what it means to be an ELA student—including opportunities for greater student voice; collaboration; and fostering confidence, pride, and creativity.

While about half of COMP teachers noted they *wanted* to make shifts that would better engage their students, they often did not specify *what they were doing* to keep students more engaged. Three COMP teachers endeavored to build strategic student choice into their curriculum—in topics of writing or in the selection of readings—to increase student engagement, with mixed success. Otherwise, COMP teachers often referenced their attempts to make traditional curriculum more engaging rather than shifting content to be more authentic to students. COMP teachers struggled to engage students consistently. One said:

> I try every year to make it more fun, to make it more creative, to make it more inviting. And I'm not sure. And they're . . . just as resistant to using Chromebooks as they are to writing on paper and pencil. And so, I haven't really found anything that makes it less or more inviting.

PBL teachers also deemed their previous "traditional" approaches aiming to engage students as limited. One said of her pre-PBL practice, "No wonder they [were] misbehaving. Look at what I [was] having them do." Many PBL teachers stressed the ways student choice built into projects, and the resulting personal relevance of students creating for real audiences led to greater engagement. One explained: "I think because there is so much choice, that kids do generally get pretty engaged." Nonetheless, a project-based approach was not a panacea; one teacher with low PBL implementation shared, "I just don't think they were as engaged as I thought they might be with this when I first heard about it." And some teachers observed that their students did not necessarily get excited about the choice and products involved in some projects; for example, one shared that his students said, "No one wants to do the museum exhibit." Students and teachers have preferences for particular PBL projects and found some enactments more engaging than others.

ELA Standards & Skills. Many PBL teachers were concerned with not fully addressing some ELA standards and

skills considered part of traditional curriculum and/or the Common Core and questioned how to integrate these standards into projects. Key concerns for many centered on grammar and vocabulary instruction. One said:

> It's hard to decide where the language standards should go, the grammar and that sort of thing. They happen sort of organically in any of these projects and then it's usually just a mini-lesson or re-teaching of something. It might even just be a shoulder to shoulder conversation about, "Hey, I'm noticing this a lot in your writing."

Another area of concern for some PBL teachers was having enough *formal* writing opportunities. One explained,

> As far as formal writing, we didn't do enough of it. They need more practice. And it just wasn't built into the projects. They brought their binder and they wrote their description of their museum artifact and they wrote their script for their video. But that wasn't formal.

Such reactions, in part, reflected a tension for teachers about broadening definitions of literacy. Broadening definitions include interpreting graphic novels for the first time or composing more varied forms of products in response to literature beyond classic literary analysis texts. Several teachers also seemed to suggest that students should just know how to integrate traditional ELA skills into their projects without direct instruction or models.

Renewal and Passion. Several PBL teachers reflected a sense of renewed well-being and professional success. For instance, a 20-year teacher said:

> I was feeling pretty burned out; I mean as a lot of teachers are after teaching for as long as I've been. And all my tips and tricks that I've used over the years really weren't working any more. I had tried a lot of things and I wasn't seeing the shifts that I wanted to see and I wasn't seeing the engagement that I wanted to see.
>
> And so I think the invigoration came in with just seeing them engaged and just seeing them excited about learning and seeing them interacting with each other in mature and responsible ways and having deep conversations and I didn't feel like I was pulling out their fingernails. I mean they were enjoying it. . . . [Compose Our World] actually let me come back to myself and the kind of teacher I am.

Though this is not representative of all PBL teachers' experiences, many teachers in our sample mentioned similar senses of renewal and related desires to sustain PBL aspects in their ninth-grade ELA classes. Some also shared they had extended the use of the design principles and practices to other secondary ELA classes. One teacher said, "I have a new prep next semester, and I'm already thinking about how I'm going to transform it to be more project-oriented." The teachers who expressed this often noted that the professional community of educators working together on PBL was key to supporting changes in practice. Additionally, early successes implementing PBL, supported by an adaptable curriculum, were key to sustaining the work. Most teachers in their first year of enacting PBL did not feel they had "arrived"—they would need administrative and peer support to continue their journeys, and they knew the lack of these could undermine their progress and resolve. But with recognition of contingency, they seemed to have embarked on a new leg of their journeys as educators, inspired by how PBL was changing their students' experience for the better.

Students' Perception of Experiences

Overall, student responses to the PBL Student Survey aligned with researcher observations and teacher self-reports. Being in a PBL classroom is a significant predictor of higher authenticity scores (on a scale from 1 [never] to 4 [always], PBL $M = 2.74$, $SD = .85$; COMP $M = 2.63$, $SD = .85$). Additionally, there is a significant positive interaction between students identified for special education services in PBL classes and total authenticity score. On average, PBL students responded about one-quarter of a standard deviation higher on authenticity items than comparison students, and PBL students identified for special education services responded about half a standard deviation higher than comparison students without special education designations.

SEL outcomes were assessed through collaboration items on the PBL Student Survey and the Panorama Survey. PBL was a significant predictor of participating in collaborative activities (log odds 1.959, $p < 0.01$). Students who responded affirmatively to working in small groups were also asked if they worked in a group lasting for more than one period (extended collaboration). Again, PBL was a significant predictor of participating in extended collaborative activities (log odds 0.758, $p < 0.01$). There was no difference in the student-reported quality of collaboration (on a scale from 1–4, short collaboration: PBL $M = 2.97$, $SD = .80$, COMP $M = 2.95$; $SD = .79$; extended collaboration: PBL $M = 3.01$, $SD = .79$; COMP $M = 2.98$, $SD = .80$). Table 7 outlines authenticity and SEL collaboration outcomes.

There was no difference between PBL and COMP students on the Panorama survey scales for engagement, belonging, relationships, awareness, or effort. As noted previously, recent information about the Panorama suggests it tends to measure school effects over teacher or classroom effects.

Discussion and Implications

Summary of Findings

Despite growing interest in PBL to better address equity, engagement, and robust academic learning, we routinely hear questions such as:

- Is PBL viable in real schools at a scale beyond isolated "boutique" instantiations by "exceptional" teachers?

TABLE 7
Regression Analysis Results of Authenticity and Participation and Quality of Short and Extended Collaboration

	Dependent Variable				
	Authenticity	Participated in Collaboration	Quality Collaboration	Participated in Extended Collaboration	Quality Extended Collaboration
	OLS (1)	*Logistic* (2)	*OLS* (3)	*Logistic* (4)	*OLS* (5)
Intercept	0.058	1.368**	0.191**	0.950**	0.090
	(0.065)	(0.198)	(0.071)	(0.154)	(0.075)
PBL	0.235**	1.959**	0.028	0.758**	0.035
	(0.049)	(0.168)	(0.053)	(0.116)	(0.057)
Standardized age	0.006	0.014	−0.035	−0.172**	−0.030
	(0.023)	(0.075)	(0.024)	(0.056)	(0.026)
White	−0.295**	−0.329	−0.192**	−0.119	−0.115
	(0.063)	(0.199)	(0.067)	(0.152)	(0.072)
SPED	−0.255	0.272	−0.523**	−0.223	−0.107
	(0.180)	(0.434)	(0.196)	(0.367)	(0.232)
ELL	−0.223	0.513	−0.136	0.434	−0.165
	(0.172)	(0.760)	(0.174)	(0.498)	(0.184)
FRL	0.056	0.253	−0.041	−0.052	0.014
	(0.055)	(0.165)	(0.058)	(0.133)	(0.061)
Low prior math scores	0.030	0.043	−0.033	−0.094	−0.158
	(0.075)	(0.232)	(0.078)	(0.177)	(0.085)
Low prior ELA scores	−0.088	−0.755**	−0.226**	−0.150	−0.038
	(0.066)	(0.208)	(0.070)	(0.161)	(0.075)
Standardized enrollment	0.035	0.024	−0.051	−0.099	−0.070
	(0.038)	(0.109)	(0.040)	(0.087)	(0.043)
Standardized proportion school FRL	−0.103	−0.216	−0.168**	0.103	−0.182**
	(0.060)	(0.198)	(0.064)	(0.151)	(0.067)
Standardized proportion school white	0.056	−0.006	−0.032	0.176	−0.053
	(0.052)	(0.172)	(0.055)	(0.130)	(0.058)
Standardized proportion school ELL	0.060*	0.536*	0.037	0.083	0.047
	(0.025)	(0.252)	(0.027)	(0.071)	(0.029)
PBL*SPED	0.508*	−0.127	0.612**	1.060	0.062
	(0.220)	(0.688)	(0.235)	(0.551)	(0.264)
Observations	2,010	2,086	1,830	2,086	1,606
R^2	0.043		0.029		0.018
Adjusted R^2	0.037		0.022		0.010
Log likelihood		−715.863		−1,079.371	
Akaike inf. crit.		1,459.726		2,186.741	
Residual std. error	0.981 (df=1996)		0.989 (df=1816)		0.995 (df=1592)
F statistic	6.939** (df=13; 1996)		4.154** (df=13; 1816)		2.236* (df=13; 1592)

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

- Is PBL viable and appropriate in English language arts or just certain subjects like science and social studies, especially at the secondary level?
- Will teachers who do the hard work of transforming their ELA classrooms to be more project-based find it worthwhile?
- Will students' experiences of PBL live up to the promise of fostering engagement and motivation while not distracting from academic learning outcomes?

Based on our results, the answers to these questions are *YES*. We found that classrooms enacting PBL design

principles were buzzing and blooming (Brown, 1992) with many of the hallmarks of project-based learning and other child-centered approaches. The students were working on projects that were authentic—meaningful and relevant to them—and with real audiences such as family and community members the students cared about. Students collaborated on these projects, and they had support in caring for and advocating for one another as they worked together. The projects were built over time, with interim products that students received feedback on and revised with embedded reflections. Looking across classroom observation data, professional learning, and teacher interviews, we saw PBL in ELA as an ideal space for critical literacy, where many teachers and students used the Compose Our World design principles (authentic making, SEL, iterative design cycles) and curriculum (exploring questions such as "What does it mean to be human?") to explore and reframe ways of being, knowing, and doing in ELA (Stamatis, 2021; Vasquez et al., 2019).

COMP classrooms, as observed by researchers and reported by teachers on instructional logs and in interviews, tended to have many hallmarks of "traditional" school instruction (e.g., Cuban, 1984), often enacted with high-quality routines and practices. These teachers covered the curriculum regarding mechanics of reading and writing and imparted knowledge of key concepts in literary and nonfiction textual analysis. The teachers did most of the talking, but many had also structured learning so their students were active and supported. The assignments in these classrooms were typically completed by students alone and contained in daily lessons disconnected from each other.

Based on findings from observation data as well as teacher and student surveys and teacher interviews, we found that for many ninth-grade ELA teachers, PBL was achievable across a range of settings. PBL teachers shared a broader view of what success meant and felt they were meeting a wider array of learning standards than typical comparison teachers. Whereas many PBL teachers felt rejuvenated in their careers, some reported they felt spread thin and recognized they needed ongoing administrative or peer support to continue this model. In contrast, nearly half of the comparison teachers expressed continuing their years-long struggle with how to better engage students.

Students perceived PBL instruction to have significantly more authentic learning experiences that were meaningful to them and to others. Significantly more students felt inspired and creative. More felt able to share ideas with others, felt listened to, and thought about other people's perspectives. These differences were greater for students with disabilities, an important finding given the lack of research on models like PBL and students with disabilities (Noguera et al., 2015). And these outcomes did not come at a detriment to ELA learning; in work reported elsewhere, we found no significant differences across classrooms in the PBL group and comparison classrooms on a measure of academic writing outcomes (Boardman & Polman, 2019). These student outcomes matter, especially if we hope to achieve more equitable and meaningful learning.

The Importance of Professional Learning and School Context

While we emphasize the high level of PBL enactment for the majority of PBL teachers, we note that these teachers were well-supported according to contemporary expectations for professional development (e.g., Darling-Hammond, 2012). They participated in 5 to 7 days of professional learning, had access to all curriculum materials, and received regular support from university coaches with PBL expertise. The PBL curriculum was developed by educators and researchers who codesigned, tried out in their classrooms, and revised the PBL projects over a 3-year period prior to this study (Boardman et al., 2021). Professional learning emphasized ways to meet content standards and adapt materials while maintaining foundational PBL design principles. Aspects such as which texts are used, the extent to which a teacher spends time scaffolding one ELA skill over another, and even the essential project challenge were encouraged to be taken up differently across contexts.

Enactment quality ranged across classrooms. While it is encouraging that 70% of PBL teachers engaged in mid- to high-quality PBL, five of the seven teachers who engaged with PBL to a lesser extent were all in one school. Our analysis confirms that working conditions and school norms made it more challenging for certain teachers. In this school, joining the project was encouraged by the school district, with a perception by school leaders that teachers would benefit from PBL and professional support. This school was also characterized by district leaders as having a culture of compliance. In professional learning and coaching as well as classes observed, teachers at this school tended to do what they were asked but seemed to lack confidence and agency both to innovate instruction and their expectations for their students. Further, unlike in other schools, no champion of PBL emerged in the teacher group, and perhaps as a result, teachers never formed a learning community or a sense of energy around PBL. Others have highlighted the importance of recognizing enabling conditions for PBL and individualizing support based on school context (Condliffe et al., 2017; Potvin et al., 2021, 2022; Zuckerbrod et al., 2021). We found two primary enabling conditions common across several PBL studies, including the present work (Potvin et al., 2022). First, teacher agency—or the ability to make instructional decisions and to adapt materials to support student needs—influenced the uptake and continued use of PBL. Second, student engagement, as individually defined by teachers, also supported the enactment of PBL. Future research

should explore ways to individualize support for teachers and schools and may also consider different entry points for professional learning, such as spending time supporting structures for teacher collaboration and instructional decision-making prior to or alongside learning about PBL.

Important Tensions Arose Between Traditional Instruction and PBL

The shifts in PBL classrooms likely contributed to another theme around student engagement, an important construct that is not easily defined or measured (Reschley & Christenson, 2022). We are drawn to what Wang et al. (2019, p. 1087) refer to as "the linchpin connecting energy, purpose and enjoyment" that goes beyond on-task behavior or participation. We found that different measures of this construct in our study yielded apparent differences. On instructional logs, teachers in comparison classrooms reported higher levels of "engagement and participation," but in interviews, these same teachers shared persistent challenges garnering student interest. It is difficult to assess the extent of energy and purpose in student engagement when a student sits quietly at their desk with a book or a paper in front of them; this compliance may be viewed in the moment as engagement, in terms of on-task behavior or participation. These findings might also indicate that PBL teachers and their students struggled periodically to adapt to instructional shifts. Still, PBL teachers more frequently discussed ways that students were engaged in PBL whereas COMP teachers shared limited or failed attempts to increase student engagement. And as mentioned previously, students also shared that PBL learning experiences felt more meaningful. These moments of success related to student engagement are not only supportive of the continued use of PBL (Potvin et al., 2021) but may also have fueled positive feelings about teaching, an outcome that is critically important in the current education climate in which more than half of U.S. teachers report contemplating leaving the profession earlier than anticipated and more than 90% are experiencing burnout (Walker, 2022). Future research on PBL should look for ways to clarify meaning and types of engagement.

A persistent challenge in PBL—and one expressed by teachers in this study—was the tension around content coverage and instruction of standard ELA skills such as vocabulary and traditional essay writing (Bickmore et al., 2005; Trepper et al., 2022). Teachers worried about not emphasizing instruction in skills and standards within PBL projects despite seeing the benefits of taking time for students to engage in inquiry and to develop real-world skills such as planning for and conducting interviews, creating a digital story, or talking to an audience. Although all of the projects were intentionally aligned to grade-level ELA standards, the format may not have been familiar or explicit enough. Similarly, teachers both appreciated and shared concerns related to expanding notions of texts from a focus on the more traditional (e.g., novels, short stories, poetry) to the inclusion of social media, blog posts, and websites as valid and valued forms (Vasquez et al., 2019).

Expanding notions of text or moving to student-centered instruction in PBL are examples of what Coburn (2003, p. 4) has termed "deep change" or the type of shifts that are reflected in teachers' beliefs and pedagogy. One way we attempted to facilitate change was to focus professional learning on design principles or core features of PBL rather than strict adherence or fidelity to a set of lessons that make up a project (Gutiérrez & Penuel, 2014; Kirshner & Polman, 2013). In this way, teachers can do the adaptation and reinvention they need to make substantive shifts that work for them (Morel et al., 2019; Potvin et al., 2021) within flexible enactments that consider individual, dynamic, and complex contexts. While this approach honors teachers' expertise and is intended to address diversity across enactments, it can also create tension for teachers who, for various reasons, may be unprepared or unsupported to plan with such flexibility (Chisholm et al., 2019; Potvin et al., 2023).

Further, PBL frameworks may need to leave room and offer support for teachers—either as part of PBL projects or separate from them—so teachers can provide instruction and practice in skills and standards that students need or are required to learn. Potvin et al. (2021) found that even small, incremental changes can build into larger long-term consequential shifts. They note that teachers should be able to go at their own pace with professional learning that lasts long enough to support change over time. As demonstrated by this study, such change can have profound effects on providing authentic and socially-emotionally rewarding learning experiences for students and teachers, so it is well worthwhile.

Conclusion

PBL is a complex endeavor that has shown promise for increasing student academic and SEL outcomes (Condliffe et al., 2017; Saavedra et al., 2021). Our study adds research to support the use of PBL in ELA classrooms, showing that it is feasible for teachers to implement and results in positive outcomes for students. Further, our focus on students in lower SES schools and positive results for students identified with disabilities points to the potential importance of PBL for offering rich, equitable, and meaningful learning experiences for all students. As others have noted (e.g., Grossman et al., 2021), PBL may be the most successful, and have the greatest potential for sustained use over time, when teachers are able to adapt to their specific contexts, receive extensive and long-term support, and see that students are making progress toward important skills and standards. Finding ways to highlight and share teachers' successes with PBL may help teachers new to PBL to see the

potential for their students and their classrooms. Further, ELA teachers need to have opportunities and support to use design principles to build their own PBL projects and to make decisions about the extent to which each unit or project they teach will be project-based, without feeling overburdened by planning. Finally, research and development are needed to expand the ways in which we assess student outcomes to better reflect what students are learning and doing in PBL (e.g., assessing student products such as digital stories, museum exhibits, etc.). We view designing and facilitating varied uses of PBL that can be supported at scale as a welcome challenge for curriculum designers, researchers, and educators.

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