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Embedded vs. Drop-in Tutors in Developmental Writing Contexts: Course/Tutoring Perceptions and Impact on Student Writing Efficacy

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Embedded vs. Drop-in Tutors in Developmental Writing Contexts: Course/Tutoring Perceptions and Impact on Student Writing Efficacy

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Abstract Many higher education institutions offer drop-in tutoring programs hosted by writing specialists to support struggling students while others may also/alternatively embed tutors directly into courses. In this quasi-experimental study, we compared survey results from 100 students in basic/developmental courses that featured embedded peer tutors with 78 students who experienced tutoring via a walk-in writing center. Variables explored included writing efficacy and course/tutor perception survey items. While students generally found both embedded and walk-in tutoring to be helpful, the ratings for embedding tutoring tended to be statistically stronger for most variables we investigated, suggesting that students responded more positively to embedded tutoring.

Keywords embedded tutoring, drop-in tutoring, writing center research, developmental writing contexts

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Introduction

Drop-in tutoring is a commonly encountered model in writing centers across the country (Savarese, 2021). The embedded model, on the other hand, places peer tutors in particular classrooms where they are briefed on the class. Embedded tutors learn about the major assignments and writing expectations of the course by meeting with the course instructor and are thus likely better prepared for tutoring sessions and to provide feedback more in line with that of the instructor compared to the drop-in model (Zawacki et al., 2008). Embedded tutors work more closely with instructors and can build rapport with the same students over time (Epstein & Draxler, 2020; Marshall et al., 2019; Racchini, 2020). They thus become familiar with the particular strengths and weaknesses of each student, which can provide students with stronger continuity of feedback across tutoring sessions over a term.

In our context, our recently implemented embedded tutoring program was designed so that tutors who are a part of our walk-in program could also be embedded in certain developmental writing courses. We accordingly

became interested in contrasting the embedded tutoring model with the drop-in model. Our lead researcher and tutoring program director, Kendon Kurzer, holds a particular passion for researching the embedded model, as he was an embedded peer tutor as an undergraduate student and created an embedded tutoring program designed to support multilingual students in sheltered first-year composition courses. Anna Hayden and Jennifer Nguyen, undergraduate peer tutors newly introduced to the embedded model and co-researchers in this study, experienced both the embedded and drop-in models firsthand. Hayden and Nguyen note the embedded model's considerable potential given the resources and thorough preparation it provides, which, in turn, allowed them to better help their fellow peers with their class assignments. Collectively, we developed this study contrasting writing efficacy and opinions toward tutoring from survey responses from students who experienced embedded vs. drop-in tutoring.

Literature Review

Writing centers and developmental writing programs at higher education institutions offer support for individuals who have not mastered writing proficiency—often evaluated via assessments prior to attending college—or those who seek to improve their writing conventions (Southard & Clay, 2004). Developmental writing courses may offer integrated tutoring and increased scaffolding to create more intentional, strategic writers who are prepared for the kinds of writing demands expected in first-year composition contexts and beyond (Pacello, 2019, p. 14). Via developmental writing courses, students may have increased opportunity to develop stronger "meta-cognitive awareness" and mastery of writing conventions (Topping, 1996, p. 324).

Multilingual/diverse students in particular may be unfamiliar with writing conventions and expectations in higher education contexts in the United States (Chu, 2021, p. 1). While on-campus support services for multilingual students frequently exist—such as international student services, writing center/other tutoring services, and so on—these services may not be specialized to provide specific support for students' composition courses, especially for introducing the fundamentals of writing needed at developmental writing levels. For instance, embedded tutoring programs like Writing Fellows programs, which "integrate . . . [the] best practices of writing instruction into writing-intensive courses across the curriculum, stretch out the writing process by building in cycles of drafts, conferences, and revisions" (Hughes & Hall, 2008, p. 2), activities that may be foreign to multilingual students.

Multilingual students likely experience homesickness and culture shock; the ability to communicate with a devoted tutor trained to work effectively with multilingual students and who fulfills the role of both faculty and peer may help overcome these hardships (Weigle & Nelson, 2004) as well as socialize students into U.S. writing classroom norms. The writing center—its staff, structure, and agenda—is often set apart from classroom settings and instructors, creating limited communication between instructors, tutors, and tutees. Consequently, students may face setbacks due to the separation between writing centers and instructors and thus may not take advantage of tutoring: "74% of first-year students . . . report 'never' or 'sometimes' seeking help from learning support services" such as writing centers (Savarese, 2021, p. 25). Some factors that hinder students from accessing the writing center's resources may include a "distrust [toward] a place [instructors] have no ties with" or "false expectations" about what kinds of services a writing center may provide (Spigelman & Grobman, 2005, p. 21). Moreover, tutors and students may have varying expectations surrounding the writing center, as students often prioritize "specific assignments and course grades," while tutors focus on helping students with lofty aims such as growing "as writers" (Savarese, 2021, p. 26). These tensions certainly do not hold true for all spaces of writing support in higher education institutions, and many factors influence students' decisions to utilize—or not—writing centers as resources for their writing development. However, increased embedded tutoring may be one solution toward

bridging this gap between classroom and tutoring communities.

The overarching premise of the embedded model in many higher education institutions is promoting "a transmission-of-knowledge model that displaces the possibility of mutual learning—students and teachers being changed" (Kameen, 2000, p. 59). Integrating tutors within the curriculum may promote a "greater depth of critical thinking" and increased awareness of "metacognitive processes" (Shamir et al., 2008, p. 384). The established benefits from offering embedded tutoring for developmental students have been identified from previous studies and observations. O'Meara's (2016) study explored embedded writing tutors for multilingual students, demonstrating that multilingual students who worked with integrated writing tutors achieved higher grades, and students, tutors, and professors gained a valuable experience overall (O'Meara, 2016). At Carleton College and Brown University, Hughes and Hall (2008) found that the Writing Fellows program—as embedded writing tutors are frequently named—effectively integrated collaborative learning coaching within the writing-intensive courses. Embedded tutoring programs frequently stress ideals of creating an environment in which both faculty and students' perspectives toward writing evolve; the peer tutors help "students improve their writing" and assist "faculty in teaching effectively with writing" (Zawacki et al., 2008, p. 1). In addition to promoting discussion among students and emphasizing critical thinking abilities, having more involved faculty improved the writing assignments' logistics (Zawacki et al., 2008). Tutors integrated within writing courses can stress and embody writing centers' principles and have learned to enrich their tutees' writing processes by developing stronger relationships with tutees and their instructors and promoting collaborative learning.

While embedded tutoring programs seem to have a number of pedagogical advantages compared to traditional drop-in tutoring programs, research on embedded peer tutoring is currently limited, especially regarding embedded and nonembedded comparisons. Pagnac et al. (2014) used a case study approach in their interview of a first-year seminar's professor and embedded tutor to describe the possible benefits of embedded tutoring for the target students. Epstein and Draxler (2020) and Marshall et al. (2019) also conducted quantitative and qualitative studies on embedded tutoring through the gathering of data from self-efficacy surveys, interviews, and reflection papers. Both studies gauged students' feelings toward their academic performance and growth as writers through embedded writing programs, with results pointing to embedded programs' positive impact on "student experience and success" (Marshall et al., 2019, p. 95). As in the previous studies, Racchini (2020) studied embedded tutoring in multiple course sections within a history course, finding that students who attended embedded tutoring more than five times "earned .72 of a letter-grade higher than their peers" (p. 53). Racchini's (2020) findings underline the importance of consistent attendance in embedded tutoring sessions to achieve the best outcomes.

Finally, Miller's (2020) study focused on the mindset of students engaging with embedded versus nonembedded tutoring through survey results and blindly reviewed the quality of student papers, finding that students' papers in embedded tutoring courses displayed a better quality of style and organization (Miller, 2020, p. 103). Of the 66 students enrolled in the course, only 29 took both the pre- and postsemester surveys, with 7 falling into the embedded experimental group (Miller, 2020, pp. 113–114). Despite the small sample size, Miller (2020) found a nearly significant difference with a large effect size of students' growth mindset in the embedded section versus the nonembedded section (p. 114). Moreover, via a blind rating of 102 papers, Miller (2020) also found that students in the embedded section had earned higher scores on their final drafts compared to "their respective first drafts," particularly in the areas of organization, style, and mechanics (p. 115); in contrast, those in the nonembedded sections did not do significantly better on their final drafts. Miller's (2020) study provides an important aspect of embedded and nonembedded course comparisons that gauges students' feelings and performance in writing.

Given our focus on embedded tutoring for developmental writing students, research surrounding developmental writing classrooms and embedded tutoring's possible impact within such classrooms is also relevant. However, such research is extremely limited. Drop-in tutoring as commonly found in writing centers, rather, has taken center stage in discussion of developmental writing courses and tutoring in general. Drop-in tutoring provides a sound basis for the effectiveness of tutoring, though strategies toward tutoring improvement and research on writing program developments have mainly prioritized the discussion and research of drop-in tutoring, rather than tutoring's potential expansion and possible improvement through innovations like increased embedded tutoring. As Savarese (2021) pointed out, drop-in tutoring has been "well-documented" in a multitude of studies (p. 48). Cooper (2010) researched the benefits of drop-in tutoring, identifying its effectiveness for student persistence and GPA averages (p. 33). Other studies, such as Denny et al. (2018), Raymond and Quinn (2012), and Ervin (2016), to name a few, discussed the benefits and challenges of writing center tutoring. Thus, a multitude of articles on writing center tutoring discussed the positives and negatives of drop-in tutoring and strategies toward general tutoring improvement.

Much has been written about the benefits of and strategies for tutoring in developmental writing contexts. Carstens and Rambiritch (2021) wrote on the directiveness approach to tutoring, while Carpenter et al. (2014) and Ruegg et al. (2017) discussed strategies for improving tutoring programs, with implications for embedded tutoring programs as well as traditional drop-in programs. In one of the few studies of embedded tutoring in developmental writing contexts, Raica-Klotz et al. (2014) conducted research on the experiences of embedded tutors' identities, which, though providing an important perspective, does not touch on the experiences of the tutees themselves and the impacts of embedded tutors on students' classroom performance. Webster and Hansen (2014) also evaluated the effectiveness of an embedded tutoring model for writing undergraduate and graduate courses. Students, teachers, and tutors found the experience to be valuable at different levels; some students and tutors benefited greatly from collaborating with one another whereas some instructors were unaffected and vice versa (Webster & Hansen, 2014). Despite this variation, the embedded tutoring model researched in this study provided students with consistent feedback throughout the course and exposed them to different writing styles (Webster & Hansen, 2014).

Interestingly, in an additional study, Chu (2021) outlined the mismatched goals of tutors and students in support of multilingual developmental writing students through a qualitative study (Chu, 2021). Though meaningful in its discussion of the mismatched expectations of tutors and tutees within writing programs along with the potential of embedded programs for student success, the study's qualitative design leaves space for further research regarding student "performance and improvement" through the embedded model (Chu, 2021, p. 7). Similarly, O'Meara's (2016) research highlighted the benefits of embedded tutoring by implementing and investigating a second language writing tutor program for courses for multilingual students. Multilingual courses tend to be developmental as students stemming from different backgrounds struggle to adapt to standard writing conventions and require more individualized attention to familiarize themselves (O'Meara, 2016). By the end of the course, most multilingual students perceived embedded tutoring as beneficial because they had a third space to form a strong rapport with their tutors and to develop an individualized plan for improving their writing conventions (O'Meara, 2016).

Clearly, more research on embedded tutoring in developmental writing contexts is greatly needed. As our study outlines, the benefits of tutoring programs can further expand beyond drop-in tutoring. Through our comparison of drop-in and embedded tutoring sessions, we argue the benefits of embedded tutoring as a means of further improving students' academic performance and critical thinking skills.

The main objective of our study is to determine if incorporating embedded tutors

within the curriculum will lead to a greater understanding of deliberate/strategic writing approaches and an increase in critical thinking skills among developmental students. We focus our survey data on areas such as student backgrounds, writing efficacy, academic performance, and feelings toward the peer educator model in our comparison of embedded and drop-in tutoring.

Research Methodologies

Study Research Questions

The following research questions guided this study:

- If at all, in what ways does embedding writing peer tutors in developmental writing classes affect students' perceptions of their writing courses and writing efficacy compared to traditional, drop-in tutoring?
- How do students in courses with embedded writing peer tutors perceive that tutoring compared to students who experience traditional, drop-in tutoring?

Study Context

Statewide, University of California students must demonstrate proficiency in college-level writing by satisfying the entry-level writing requirement (ELWR). At UC Davis, students need to fulfill the following writing requirements: Entry Level Writing (developmental or basic writing), English Composition (typically consisting of one lower and one upper division writing course), and Writing Experience (writing-intensive courses taught in the disciplines by disciplinary faculty). Many students satisfy ELWR prior to arriving at UC Davis via standardized tests or relevant Advanced Placement or International Baccalaureate test scores. In the absence of such evidence of writing proficiency, incoming first-year students take a writing placement survey developed and administered in-house by the University Writing Program (UWP). Outcomes of the placement survey dictate which path (how many courses) students must take in order to fulfill the ELWR. While average numbers vary, for fall 2021, 3,015 students (out of 7,585 incoming freshmen) were placed into pathways requiring one developmental course to fulfill the ELWR, of whom 575 also were required to take one or two additional sheltered developmental courses designed specifically to support multilingual students (Southard & Clay, 2004). These classes are writing classes with a heavy language support component.

Tutoring Program Description

Historically, ELW/developmental writing courses have been a meaningful barrier preventing students from successfully and timely moving through their degrees, although this barrier has been greatly reduced in recent years through a variety of pedagogical and programmatic interventions. Relevant to this paper, UWP administrators created an in-house tutoring program devoted exclusively to supporting students in ELW courses (including the multilingual sheltered courses). Undergraduate peer tutors—called peer educators in our program to distinguish them from other unionized tutors at UC Davis—are recruited from across campus and volunteer their time and efforts, earning only university internship credit (peer educators are not financially compensated). Peer educators enroll in a practicum course that provides internship units for both time spent tutoring and time spent in training. Because of the resource limitations (internship units must be split between tutoring and training time and peer educators are not paid), the peer educator program has remained relatively small, with a high turnover of peer educator tutors term-to-term, although it has grown larger in its current iteration. Our tutoring program director, Kurzer, has been the faculty member responsible for recruiting, training, and supervising all peer educators in our program over the past several years.

As originally conceived, all peer educator tutoring was held in face-to-face contexts, with tutoring sessions lasting approximately 20–30 minutes. While students could sign up for appointments online in advance, we also offered drop-in tutoring sessions.

Implementation of Embedded Tutoring

Because Kurzer had been involved in adapting and creating embedded tutoring programs in the past, he explored the possibility of expanding the peer educator program to include an embedded component. Accordingly, after conversations with program administrators and interested colleague faculty members, he began embedding peer educators into two to four sections of courses under the ELW umbrella per quarter (including several sections of sheltered multilingual writing courses).

As implemented, embedded peer educators worked directly with the instructor of their assigned ELW section. All students of their assigned section were required to meet with a peer educator on two assignments per quarter. At least one of these assignments was a synthesis paper in which students identified trends/themes among a small body of assigned sources with the aim of practicing integration and synthesizing sources, a common issue among developmental writing students like this (Luo & Kiewra, 2019; MacMillan & Rosenblatt, 2015). The second assignment varied, but frequently included genres like literacy narratives, reading response papers, and so on.

A strength of the embedded model of peer tutoring is that tutors can develop more authentic relationships with course instructors and their students (Marshall et al., 2019). Accordingly, peer educators may more effectively act as go-betweens to better help scaffold student learning (Epstein & Draxler, 2020; Marshall et al., 2019; Racchini, 2020).

We should also note that Kurzer adapted various aspects of the mainstream drop-in tutoring program to take advantage of some of the features that make embedded tutoring more effective. For example, he created an email account for students to email drafts of papers in advance so peer educators could come to tutoring sessions better prepared as they had already been able to read and respond to the papers. Kurzer also collaborated with course instructors to compile a database of the common assignments used in ELW courses so peer educators could better understand possible assignment guidelines without relying exclusively on their students' understanding.

Then, bringing in the undergraduate peer educators Hayden and Nguyen, we collectively developed this IRB-approved research project to collect data exploring possible differences in how the embedded program vs. the mainstream drop-in tutoring program were received by students. In sum, in this quasi-experimental study, we contrasted efficacy/attitudinal survey responses of students in ELW sections that featured embedded peer educators with students who engaged only with peer educators via our mainstream drop-in program over the span of five total quarters. Tutoring during this study was conducted online via Zoom, due to the nature of the ongoing pandemic.

Participants

Over the five quarters of this study, we embedded peer educators in 16 different sections of ELW umbrella courses, two of which were lower-level sheltered sections only for multilingual students. The other 14 were the main ELW-fulfilling course. Approximately 280 students were enrolled in these treatment sections, for a total of roughly 540 embedded tutoring sessions (some students missed their appointments).

When possible, we solicited instructors who were teaching more than one section of an ELW-fulfilling class to be both treatment and control by assigning embedded peer educators to one section but not the other. Unfortunately, that was not possible in most cases due to sections being combined into one Canvas—our learning management software—page, so ultimately only four instructors served as instructor of both treatment sections with embedded peer educators and control sections that relied on the mainstream drop-in tutoring. Seven different instructors taught treatment sections over the five quarters of the study.

Over the same period, roughly 400 ELW students participated in approximately 500 tutoring sessions via the mainstream drop-in tutoring program.

Table 1. Student Participants' Household Language Backgrounds

Household Language Background	Treatment (*n* = 100)	Control (*n* = 78)
Primarily English	12	11
English + Spanish equally	7	5
English + different language equally	5	4
Primarily Chinese	50	43
Two + (not English or Spanish) languages equally	15	6
Other/unknown	11	9

Naturally, not all students who engaged with peer educators successfully during the study period filled out the survey. We ended up with complete survey responses from 100 treatment students (approximately 35% of the total) and 78 control students (approximately 20% of the total), primarily multilingual students in both cases. See Table 1 for the language background of student participants.

We should also note that all peer educators who were embedded in developmental writing classes also worked in the mainstream drop-in tutoring program, although not all peer educators who worked in the mainstream program also were embedded directly into courses. Peer educators volunteered to be embedded, and we used that pool of interested peer educators to determine how many sections could include embedded peer educators.

Data Collection and Analysis Methods

In this study, we relied primarily on quantitative survey data, contrasting the responses of treatment and control students on a number of writing efficacy and class attitudinal items. (See Appendix A for a list of the survey items.) Variables we investigated in this study included efficacy items, ranking various classroom activities, self-reported anticipated course grades, and student opinions about working with peer educators. Efficacy questions investigated the quality of general course instruction, grammar instruction, teacher feedback, grammar feedback, overall helpfulness of the course, tutor/peer educator feedback, and peer feedback. We also asked students to rank the following classroom activities from most to least helpful: teacher lecture, teacher feedback, tutor/peer educator feedback, peer feedback, class readings, and grammar instruction. To adhere to privacy considerations, rather than collecting student course grades directly, we asked students to self-report their anticipated grade. Finally, we asked specific questions about their experiences with the peer educator tutoring program and how students felt it impacted their understanding of academic writing conventions, academic paper organization, idea development, and accuracy, as well as how well the peer educator addressed their concerns about their papers, helped students create revision plans postconference, and how likely students would be to recommend their peer educator to a friend.

The survey was administered under the guise of evaluating the developmental writing classes in general, rather than specifically about the peer educators' tutoring, to avoid leading the participants. Because the control students were enrolled in ELW courses and participated in the mainstream drop-in tutoring program, survey items were identical for both groups. Student responses were typically close-ended, converted to numeric values (i.e., strongly agree = 5, agree = 4, neither agree nor disagree = 3, disagree = 2, strongly disagree = 1), and then compared. Because each variable was analyzed independent of the other variables, we compared the treatment and control group means via two tailed *t*-tests. We also calculated effect sizes (Cohen's *d*) attributable to the embedded tutoring treatment.

The survey included a few open-ended follow-up questions. Because few students filled out those questions, we lacked enough data to conduct meaningful qualitative

analyses. We did, however, identify a few salient quotes from the open-ended questions to briefly mention in our results and discussion section.

Results and Discussion

In this section, we report the results and discussion of our study, organized by research question.

RQ 1: Impact of Embedded Tutoring on Student Writing Course Perceptions and Writing Efficacy

As outlined in the methodology section, treatment students who were assigned to work with an embedded peer educator tutor and control students who visited the drop-in tutoring program both took a survey that featured a number of questions asking about students' thoughts on their developmental writing courses and the efficacy of their own writing. Table 2 contains the *t*-test results contrasting the two groups' average responses.

As noted in Table 2, treatment students reported statistically higher ratings regarding general course instruction, teacher feedback, overall helpfulness of the course, and tutor feedback, with corresponding moderate effect sizes. We find these responses intriguing as they suggest that the impact of embedded tutoring may go beyond just the actual tutoring. When instructors embed tutors into their classes, they need to rethink assignment sequences and may end up with stronger scaffolding than they would otherwise develop. Also, if instructors help students process the feedback they receive from tutors, that could help create a more cohesive, productive learning environment beyond just receiving additional feedback from a tutor.

As Miller (2020) notes, embedded tutors may very well shape the classroom structure and instructors' mindset given their distinct position, which may account for our findings. Marshall et al. (2019) conducted a study that compared embedded and nonembedded tutoring in terms of faculty self-efficacy assessments; their findings point to the importance of embedded tutors in an instructor's own strengthened "understanding for how to better support and dialogue with students" (p. 95). As suggested through our findings, instructors may restructure their lesson plans for embedded models and work more personally with students based on the notes from embedded tutors. What Raica-Klotz et al. (2014) call a "Non-Instructor Identity," tutors'

Table 2. Two-Tailed *t*-test Results of Writing Efficacy Survey Items

Question	Group	*N*	*M*	*SD*	*t* ratio	*p*-value	Cohen's *d*
General instruction	Control	78	5.59	1.39	2.270	.012*	0.306
	Treatment	100	5.96	.99			
Grammar instruction	Control	78	5.79	1.20	–.031	.487	0
	Treatment	100	5.79	.94			
Teacher feedback	Control	78	5.45	1.32	3.340	<.001*	0.466
	Treatment	100	5.96	.81			
Grammar feedback	Control	78	5.74	1.23	–.270	.394	0.034
	Treatment	100	5.70	1.10			
Overall helpfulness	Control	78	5.62	1.17	2.650	.004*	0.342
	Treatment	100	6.01	.82			
Tutor feedback	Control	78	5.58	1.39	1.790	.037*	0.240
	Treatment	100	5.87	1.00			
Peer feedback	Control	78	4.91	1.90	.503	.308	0.057
	Treatment	100	5.01	1.59			

*Statistically significant difference between control and treatment means at $p < .05$

identity between that of instructors and students, presents a unique space that can be "helpful to students" (p. 24). Embedded tutors thus provide a beneficial bridge between student and instructor, which can demonstrate the effectiveness of embedded tutoring models on classroom structuring and instructor preparation (Miller, 2020), aligning nicely with our research findings. Through the embedded tutoring model, peer tutors can accordingly effectively act as a go-between for peers and instructors (Carpenter et al., 2014; Marshall et al., 2019; Raica-Klotz, 2014).

In addition to the efficacy items outlined above, we asked students to rank the helpfulness of various classroom pedagogies. Table 3 contains the *t*-test results comparing how treatment and control students ranked those pedagogies.

As seen in Table 3, the treatment group ranked peer educator feedback higher and teacher lecture lower than the control group. Interestingly, looking at the treatment group average ranking from highest to lowest revealed the following: teacher feedback, peer educator feedback, teacher lecture (barely; peer educator feedback and teacher lecture were ranked nearly the same), class readings, grammar instruction, and peer feedback. The control group average rankings from highest to lowest were similar: teacher feedback, teacher lecture, peer educator feedback, class readings, peer feedback, and grammar instruction. The two rankings were similar as each group had a higher and lower ranked grouping that consisted of the same course features. This is encouraging as it shows that the mainstream peer educators program was still seen as valuable to the control group, just not quite as valuable as to the treatment group where the peer educators were embedded directly into the courses.

The embedded tutor position further strengthens the pedagogical transaction between student, tutor, and instructor. Often, writing courses are structured to establish the faculty as the authority whereas students strive to succeed in their course by following the instructors' expectations; consequently, they may not have a strong grasp of the global priorities in their writing. Likewise, drop-in tutors may not adequately address the tutees' long-term weaknesses in the limited amount of time they have with entirely new students (Kameen, 2000). For example, students who work with drop-in tutors may not experience long-term scaffolding since drop-in tutors may not be as familiar with the assignments or instructors' specific expectations. Although an embedded tutor bridges the gap between student and instructor and engages in active reflection between themselves and their tutees, their primary goal is to ensure that their students can deeply examine their writing conventions (Topping, 1996). Nguyen, one of our

Table 3. Two-Tailed *t*-test Results of Pedagogy Ranking Survey Items

Question	Group	*N*	*M*	*SD*	*t* ratio	*p-value*	Cohen's *d*
Teacher lecture	Control	78	5.38	.97	2.01	.023*	0.29
	Treatment	100	5.07	1.16			
Teacher feedback	Control	78	5.62	.79	.029	.488	0.095
	Treatment	100	5.52	1.27			
Peer educator feedback	Control	78	4.73	.98	2.404	.009*	0.357
	Treatment	100	5.08	.88			
Peer feedback	Control	78	2.28	.7	1.38	.085	0.225
	Treatment	100	2.09	.97			
Class readings	Control	78	2.85	.5	1.16	.124	0.169
	Treatment	100	2.67	1.42			
Grammar instruction	Control	78	2.12	1.19	.496	.31	.063
	Treatment	100	2.2	1.33			

*Statistically significant difference between control and treatment means at $p < .05$

embedded peer educators, experienced the different roles of serving as a drop-in tutor for individuals who sought to improve their writing conventions on their own accord and providing feedback as an integrated peer tutor within the classroom setting. Besides emphasizing global priorities in writing—thesis development, idea development, and paragraph organization, for instance—Nguyen found that her tutoring required a great deal of reflection, active learning, and adaptability, important traits for tutoring per Thompson and Pascal (2012). Granted, these aspects of tutoring are also prevalent in drop-in tutoring, but the embedded model provided Nguyen with the opportunity to establish a stronger rapport with students throughout the course, to collaborate with instructors to adjust courses expectations based on students' needs, and most importantly, to engage in a deeper discussion of writing conventions with her students.

The next variable we analyzed was students' self-reported expected grades they anticipate receiving in their ELW umbrella courses (Table 4). We relied on self-reported grades to remain in compliance with IRB expectations but recognize that this metric is likely to be flawed. Ideally, we would have been able to data mine actual course grades.

As noted in Table 4, students in treatment sections reported expecting a slightly higher course grade than did their control peers, to a statistically significant level, with a correspondingly moderate effect size. However, that difference was negligible in terms of real-world grades, as the average for both was right around a B.

Without more concrete evidence that embedded peer tutoring significantly impacts student performance via course grades, we hesitate to assume from our study that such an impact is likely to occur, regardless of the statistically significant differences seen in our groups. Despite this caveat, this finding coincides with a study conducted by Cooper (2010), in which students who visited a tutoring center had higher GPAs; even students who went to the tutoring center once "were . . . more likely to persist in their classrooms" than those who did not seek help through tutoring (p. 33). Though Cooper's (2010) study highlights the benefits of drop-in tutoring, it also points to the benefits of increased one-on-one tutoring sessions on academic performance. Our findings point to more personalized tutoring through the embedded model, building on Cooper's (2010) study. Similarly, students in a different embedded tutoring program felt greater confidence in their writing fundamentals and saw improvement in their writing and grades throughout the course (Pagnac et al., 2014).

Anecdotally, informal conversations with the instructors of the courses that featured embedded tutors revealed meaningful levels of instructor buy-in, worth noting although our study did not include a formal instructor component. Instructors mentioned that they received stronger papers from their students who met with embedded tutors compared to their experiences with students who only engaged with drop-in tutoring. As instructors started to seek embedded tutors from our program director in subsequent terms, we feel safe in assuming that the benefits of embedding tutors move beyond student perceptions and writing efficacy to include positive perceptions from their instructors as well. Further research investigating actual impact on student writing and formally on instructors' opinions of embedded tutoring would prove valuable.

RQ2: Student Perceptions of Embedded vs. Drop-in Tutoring

Beyond opinions of their classes and personal writing efficacy, our survey inquired

Table 4. Two-Tailed *t*-test Results of Student Reported Expected Course Grades

Question	Group	*N*	*M*	*SD*	*t* ratio	*p*-value	Cohen's *d*
Reported expected course grade	Control	78	6.53	1.08	2.29	.011*	0.35
	Treatment	100	6.86	.81			

*Statistically significant difference between control and treatment means at $p < .05$

Table 5. Two-Tailed *t*-test Results of Student Attitudes Toward Peer Educators (PE)

Question	Group	*N*	*M*	*SD*	*t* ratio	*p-value*	Cohen's *d*
PE impact on writing conventions	Control	78	4.15	.73	1.83	.034*	0.35
	Treatment	100	4.37	.52			
PE impact on organization	Control	78	4.24	.63	2.57	.006*	0.53
	Treatment	100	4.52	.41			
PE impact on idea development	Control	78	4.32	.64	2.15	.016*	0.43
	Treatment	100	4.56	.47			
PE impact on accuracy	Control	78	3.88	.88	–.89	.188	0.13
	Treatment	100	3.75	1.10			
PE adequately addressed concerns	Control	78	4.41	.4	1.33	.093	0.31
	Treatment	100	4.54	.43			
PE helped create revision plan	Control	78	4.28	.46	2.11	.018*	0.49
	Treatment	100	4.49	.39			
Recommend PE to a friend	Control	78	4.36	.41	2.83	.003*	0.69
	Treatment	100	4.62	.34			

*Statistically significant difference between control and treatment means at $p < .05$

specifically about student attitudes toward peer educators, contrasting the students who used embedded peer educators with those that relied on the mainstream drop-in tutoring program (Table 5 has the *t*-test results).

As seen in Table 5, treatment students gave statistically higher scores regarding how the peer educators impacted their experiences in a number of manners (with moderate to large effect sizes), although average scores from both groups were satisfactorily high, indicating that both the embedded and mainstream drop-in programs were well received.

As peer educators in this program were repeatedly encouraged to help students move beyond grammar/sentence-level concerns (both by the program administrator and the instructors of the courses featuring embedded tutors), the lack of significant difference regarding impact on accuracy is not surprising.

However, we found the higher score on how the peer educators helped create a revision plan particularly interesting. In embedded contexts, peer educators might need to spend less time reading through the paper and developing a tutoring agenda, thus freeing time for developing a concrete revision plan with tutees. Such a forward-thinking approach could better strengthen student writers and could accordingly be a strength of an embedded peer tutoring model.

Finally, we will briefly highlight a few comments from the qualitative, open-ended survey items. Just 13 (~17%) of the control students filled out the open-ended survey item asking about what best helped them (1) generally, and more specifically regarding understanding (2) academic writing conventions, (3) academic organization, (4) idea development, and (5) grammar, discussing various aspects about the class. Only 2 of the 13 mentioned the peer educators at all, and that was in conjunction with helping with academic organization and idea development.

Conversely, 36 of the treatment students filled out the open-ended survey item, with 20 identifying feedback being most helpful generally and 13 mentioning the peer educators specifically. Four students also explicitly mentioned that the peer educators helped them understand academic writing conventions, five mentioned that the peer educators helped them understand academic writing organization, and 11 mentioned that the peer educators helped them understand idea development, with one student commenting, "Feedback from everyone, especially peer educator" was helpful. Regarding academic writing conventions, one student commented, "I think peer

educators helped me a lot." These comments help reinforce the concept that the embedded peer educator program was better received than the mainstream drop-in program. Epstein and Draxler's (2020) study of embedded tutors and first-year students found similar results in terms of student reactions to embedded tutoring. One of the student's reflections stressed the peer tutor's guidance in navigating research articles, thus impacting the student's future research process (Epstein & Draxler, 2020). Another student wrote, "Working with a writing and research tutor has helped me to improve my self-development in terms of research and writing" (Epstein & Draxler, 2020, p. 519). Both students emphasized the helpfulness of the embedded tutor in their growth as writers, highlighting the way in which the embedded model—and the tutor's vital participation—is well received and acknowledged by students in our study as well.

One of our peer tutors, Hayden, noted the differences between drop-in and embedded tutoring sessions in terms of efficiency, preparation, and community building. Hayden initially started with drop-in tutoring, as its usefulness had been confirmed through student-provided feedback underlining the personal benefits of drop-in tutoring toward improving scores "on a single task" (Savarese, 2021, p. 46). Nevertheless, Hayden found that drop-in sessions presented difficulties, as they tend to revolve around thoroughly reviewing "materials and information given by the instructor together" at the start of the session, thus taking up more session time (Ruegg, 2017, p. 262). One aspect of our drop-in model that Hayden appreciated was the option for students to provide their assignment prompts and papers in advance. Often, those sessions ran the most smoothly in terms of time efficiency and prepared feedback since Hayden could review student papers and assignment prompts prior to the student meeting. Such occasional highlights of our drop-in program are essential features of embedded tutoring (Carpenter et al., 2014, p. 4).

On one hand, embedded peer educators can more easily prepare for sessions given the expectation of personal, one-on-one sessions with the students. In building connections with the students—in identifying their strengths, weaknesses, and goals—embedded tutors can foster a welcoming and productive environment that best addresses the needs of individual students (Racchini, 2020; Raica-Klotz, 2014). On the other hand, embedded peer educators also come to sessions best prepared given their close communication with instructors and grasp of the course material (Marshall et al., 2019). Though our drop-in tutors experienced occasional sessions in which they had been provided with the assignment and paper ahead of time, having close communication with the instructor and being provided with all the material at the start of the quarter better prepared Hayden to address the classroom objectives. Through the embedded model, peer tutors can address students' concerns in ways that encourage growth in writing beyond just one assignment, and hopefully, promote skills in organization and mechanics that students can take with them beyond the developmental writing course (Miller, 2020).

Conclusion

Our research revealed statistically significant differences in the perceptions developmental writing students hold toward embedded vs. drop-in peer educator writing tutors, favoring embedded tutors who are assigned specifically to particular sections, as well as gains in writing efficacy and course attitudes attributable to the embedded tutoring treatment. Such an embedded approach may help students develop stronger, more meaningful relationships with tutors since they are more likely to work with the same tutor more than once. Embedding may also level the playing field by normalizing the interactions with tutors as all students in a class are required to meet with the embedded tutors, reducing the notion that meeting with a tutor is somehow remedial or a sign of a deficit on the part of the student. Developing an environment that acknowledges and reinforces the collaborative nature of deliberate, strategic writing may be more easily done via embedded tutoring compared to drop-in tutoring programs.

Embedded peer tutors are typically trained to understand the students' course

assignments and how to structure the session in a manner where students in developmental writing courses must critically think; students are guided to identify their writing skills and to engage with the process, which should enhance their writing conventions (Titus et al., 2014), themes that resonated with students in our study as well. Hansen and Webster (2014) conducted a study similar to ours to evaluate the effectiveness of an embedded tutoring model for undergraduate and graduate writing courses. Engaging with embedded tutors allowed one student to view alternative approaches to assignments while others gradually perceived their writing assignments as tools to improve their writing style rather than a simple transaction to receive a grade (Webster & Hansen, 2014), patterns seemingly reflected by students in our study as well. Our study accordingly contributes to a growing body of literature advocating for embedded tutoring programs as feasible to better support students, especially in developmental writing contexts.

However, we recognize that embedded tutoring programs can be more time and resource intensive. It may not always be practical or realistic to embed tutors in all relevant or necessary developmental writing classes (or in other writing classes such as sheltered sections of first-year composition for multilingual students). In our program, we typically embed tutors into approximately 12 of the offered 100 or so sections of courses that fall under the developmental writing umbrella. We also should note that such a tutoring program requires more administrative support than a traditional drop-in tutoring program. However, the added costs seem to be worth it based on the results of this study. An approach similar to ours where tutors work in both embedded and drop-in contexts may prove to be an appropriate compromise, especially as such an approach can be nimbler and more reactive regarding ever-changing budgets or institutional demands and constraints.

Limitations

As with all such research, this study had some limitations. Because we could not control enrollments, students self-selected into control or treatment sections, which could have introduced some biases. Also, while the sample sizes were relatively large and allowed for statistical analyses, they represented a relatively small portion of the total population. Interestingly, students of treatment sections were more likely to fill out the survey, meaning treatment students might have had more motivation to respond because of their connection to their tutor. Additionally, treatment students' higher response rate could be a result of the instructors making the request of the students (as opposed to the control group students who received several emails from Kurzer but who lacked any meaningful relationship with him). Accordingly, especially for the control group, the survey results may not have been representative of the group as a whole.

Also, while all embedded peer educators also worked in the mainstream drop-in program (which allowed for increased control over variables), some peer educators only worked in the drop-in program, potentially impacting students' experiences. For example, while the control group largely reported positive experiences, it is possible that some nonembedded peer educators may have been less prepared for conferencing given their prior lack of experience as tutors or unfamiliarity with assignment expectations—even beyond what might be expected in a drop-in tutoring program. However, we lack any evidence that this was the case for our study.

Future Research and Implications

More studies looking at various iterations of embedded peer tutoring programs would be helpful as we could gain added understanding of possible approaches to supporting developmental writing students via tutoring. Ideally, such studies could employ randomized control/treatment sections. Studies looking at actual improvements in student work would also strengthen our understanding of possible impacts of embedded tutoring, rather than relying on student-reported data/perceptions. Longitudinal studies looking at the long-term impact of embedded tutoring on student writers and attitudes/efficacy about writing would

be valuable. Finally, investigating embedded tutoring programs beyond developmental writing would also provide valuable insights into possible ceiling effects at which embedded tutoring may no longer be as well received by students.

The strengths of embedded tutoring—stronger relationships between tutors and tutees and tutors and instructors, more deliberate and helpful feedback, and so on—do indeed seem to be present based on our research, and students responded more positively to their embedded tutors than those students who engaged with tutors in the drop-in context. While we need more resources and research to better understand the possible impacts and benefits of embedded tutoring, our current study provided valuable insights and data supporting the role embedded tutoring programs may play when supporting vulnerable students in developmental writing contexts. In our current context, we will continue to advocate for increased resources that would allow us to embed tutoring into more sections of developmental writing and beyond. As we work with more composition instructors—who then anecdotally see increased benefit and value to their students via equitable access to tutoring support and stronger papers as a result of strong tutor feedback—we expect to see more departmental buy-in that will hopefully result in our obtaining those resources. Drawing on our study to report student opinions toward embedded tutoring should also strengthen our position.

Additionally, institutional demands and constraints will obviously dictate how feasible embedding tutors into courses may or may not be. While at UC Davis (which features a large, diverse student population, a meaningful percentage of which is determined to need some additional support via developmental writing) we can staff only a small percentage of possible writing courses with embedded tutors, other institutions may find opportunity and resources to serve a greater number of their students via embedded tutoring. Although our study investigated developmental writing specifically (as our tutoring program was created to serve these most vulnerable of UC Davis' student population), we suspect that similar findings would be present in embedded tutoring programs across a range of writing and writing-intensive contexts (e.g., first-year composition, sheltered for multilingual students or not, discipline-specific writing intensive courses, etc.). We believe that the added assistance an embedded program can provide is best employed deliberately with the explicit aim of supporting those students who need it most, in whatever institutional context and to whatever level possible.

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Appendix A: Survey Questions

1. Please describe your current writing class in terms of the following characteristics: Quality of general class instruction
2. Please describe your current writing class in terms of the following characteristics: Quality of grammar instruction
3. Please describe your current writing class in terms of the following characteristics: Quality of general teacher feedback
4. Please describe your current writing class in terms of the following characteristics: Quality of grammar feedback
5. Please describe your current writing class in terms of the following characteristics: Overall helpfulness for you as a first-year student
6. Please describe your current writing class in terms of the following characteristics: Quality of tutor/peer educator feedback
7. Please describe your current writing class in terms of the following characteristics: Quality of peer feedback
8. Please rank the following activities by dragging them in order from most (listed first) to least (listed last) helpful: teacher lecture, teacher feedback, tutor/peer educator feedback, peer feedback, class readings, grammar instruction
9. Do you feel better able to write well-organized, academic essays after taking your current writing class?
10. Do you feel better able to write clear, grammatically correct sentences after taking this writing class?
11. What was generally most helpful about this English/writing class? (open-ended question)
12. What letter grade do you anticipate earning in this English/writing class?
13. Please indicate how much you agree or disagree with the following statement: I feel that the peer educators helped me improve my understanding of academic writing conventions.
14. Please indicate how much you agree or disagree with the following statement: I feel that the peer educators helped me improve my understanding of academic organization.
15. Please indicate how much you agree or disagree with the following statement: I feel that the peer educators helped me improve my understanding of idea development.
16. Please indicate how much you agree or disagree with the following statement: I feel that the peer educators helped me improve my grammatical accuracy.
17. Did this peer educator address your concerns with your paper?
18. Did you leave the conference with a clear plan for revising/editing your work?
19. Would you recommend this peer educator to a friend?