LANGUAGE TEACHER EDUCATION AND TECHNOLOGY FORUM

Digital social reading in CALL teacher education

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Abstract

The COVID19 pandemic and a host of other issues have underscored the growing need worldwide to engage language learners in online, academic, collaborative reading. To help meet this need, future language teachers should understand and be able to use digital social reading (DSR) technologies. However, the use of DSR by language teacher education students has received scant attention in the literature. Exploring DSR use in computer-assisted language learning (CALL) teacher education can provide insights into the benefits and disadvantages of DSR and suggest design guidelines for its use in teacher education and other contexts. Therefore, this classroom-based study with 12 teacher education students (TESs) and a teacher educator examined how participants read and discussed CALL texts using DSR. In uncovering benefits and disadvantages of DSR use in CALL teacher education, the study explored: (a) how the CALL TESs participated in DSR, (b) what they found of value in the readings, and (c) what the teacher educator's role was in the DSR use. Based on the findings from the study, guidelines for DSR use are offered.

Introduction

Digital social reading (DSR) involves the use of digital technology to share reading texts and foster collaboration around them through reader commenting, tagging, highlighting, and annotating (Rebora et al., 2021). Studies on the use of DSR with teachers learning to use computer-assisted language learning (CALL) are needed for a variety of reasons. For example, these teacher education students (TESs) may use DSR or similar technologies with their own students in the future (Woodward & Neunaber, 2022 say they should), and it is important that their professional development experiences help them to understand and use the affordances of DSR effectively (Blyth, 2014; Thoms & Poole, 2018). Thus, it is important to understand the experiences TESs have with DSR and what they take away from interactions around their academic texts during DSR use.

Based on the need for such studies, the purpose of this exploration is to examine how CALL teacher education students use DSR and what benefits and disadvantages DSR use may have both for their own and their future students' learning. By describing the benefits and disadvantages of DSR use, this study can help teacher educators to understand how and why to employ DSR in CALL teacher education. The study starts with a brief background on DSR use, and then the methodology section explains the study elements and the context. Following this, the findings and interpretations are presented, before implications and guidelines for teaching are discussed.

Background

Digital social reading typically consists of commenting on (or annotating) a reading in a shared digital space (Blyth, 2014); the idea is that it turns an individual, often isolated, experience into a community-based collaborative one for readers at different levels who may use different reading approaches (Adams et al., 2022). DSR can be conducted through a variety of applications with diverse affordances (see Broughton, 2020; Egbert & Shahrokni, 2021, for overviews). While studies of DSR use in teacher education are becoming more common, the focus of these studies is not specific to language/CALL teachers or focused on teacher education students' use of DSR in language teaching. For example, in one of the few teacher education studies available, Adams et al. (2022) studied the use of DSR specifically for future literacy teachers' reading comprehension. Employing a case study methodology, the authors examined data from three dissimilar female Educational Master students in a literacy course. Their study found—based on annotations of readings in the Perusall DSR app—that participants' prior knowledge and use of text and world-based connections helped them to make sense of the nine texts that were explored. They also found that many of the annotations focused on agreeing with peers while rarely offering criticism of any kind. In one other paper, Kalir (2021) expounds on the possibilities of DSR for future literacy teachers' discussions of equity; he invites teacher educators to join in the work around the use of annotation in teacher education. These works indicate that there is great potential for DSR use in teacher education; additional research is needed to add to these findings. However, in spite of the lack of teacher education DSR research, a brief review of potential DSR benefits from across different literatures can lead to research questions for the exploration of DSR in CALL teacher education.

Potential Benefits of DSR Use

Potential benefits noted in the research across a variety of contexts and populations (e.g., Broughton, 2020; Egbert et al., 2022; McNeil & Song, 2016; Tate & Warschauer, 2022; Woodward & Neunaber, 2022) include that DSR use can:

- Provide opportunities for students to make immediate notes of their thoughts as they read.
- Support task engagement and a wide variety of digital affordances.
- Facilitate reading comprehension.
- Display metacognitive processes that otherwise would be invisible to instructors.
- Fill the need for students to show that they have read.
- Prepare students for class by pushing them to have comments and questions ready.
- Expose users to a variety of perspectives.
- Allow shy or hesitant students opportunities to participate.
- Help students think about what they are going to write and how their peers might respond to it.
- Produce an increase in the student completion of reading assignments.

The benefits accrue depending on the affordances of the DSR app used and how students and teachers use and participate in DSR. These potential benefits make it worthwhile for researchers to explore DSR use in CALL teacher education from both students' and teachers' perspectives.

Research Questions

To better understand DSR use in CALL teacher education, the research questions for this classroom-based study are:

1. What do Perusall's DSR analytics show about how CALL TESs use the DSR app while reading required academic texts?
2. What patterns in focus and type of annotations can be seen in the TESs' and instructor's DSR use?
3. What role does the instructor play in DSR use?

Methodology and Context

The study embraces a qualitative paradigm because this allows for the exploration of the research questions in a natural context (Baxter & Jack, 2008). This type of research also provides an overview of the study context that can help readers evaluate the appropriateness of the learning experience for their own contexts.

Participants

This study was in a CALL methods course at a large public university in the United States' Pacific Northwest. The second author served as the instructor of the course and facilitator of DSR. At the time she was a professor with over 25 years of experience in teacher education and CALL. She had used the DSR tool in this study in three previous classes and understood the tool and its uses.

Further, three graduate students (one doctoral, two masters), eight undergraduates, and one international visiting scholar from China participated. All 12 participants were female, and all were or intended to be English language teachers. The instructor expected that DSR use, in addition to encouraging the students to read, might facilitate thinking, interaction, and sharing amongst the diverse group of students.

Teaching Context

This section explains the context and goals of the course and the DSR tool used for this study. An overview of other DSR tools can be found in Egbert and Shahrokni (2021).

Course Overview

The CALL methods course was held face-to-face in Spring 2022. The class met for two hours and 50 minutes once per week over 15 weeks. The course focus was to help participants understand research, theories, and applications in CALL and to apply this information to help their future students learn in CALL contexts.

DSR use in this course can be categorized as online, asynchronous, formal (academic and required), and persistent (Rebora et al., 2021). The course textbook addressed CALL research, theory, and practice and was an open educational resource that could be freely accessed on the Internet (Egbert & Shahrokni, 2018). The students annotated one textbook chapter in the DSR app Perusall (Perusall.com) per week, except for in Week 14, when they read two chapters. Chapters had an average of 22 pages containing 200–250 words per page and were written in simple academic language with a similar chapter structure. Screenshots, bulleted lists of points, and figures were common. Other readings were available to the class as resources for projects and extra information but were not read through Perusall.

DSR Application

This course used Perusall because the university offered access to it via the campus-wide learning management system, Canvas (Instructure, 2023). In addition, the instructor felt that it had a more intuitive and simpler interface than other platforms. Participants accessed the Perusall readings directly through Canvas course modules.

At the start of the course, the instructor explained Perusall affordances to the participants. A screen shot of Perusall is shown in Figure 1. The assigned text is on the left, with the annotation screen on the right and icons indicating functions in the menu on the far right.

Figure 1

Perusall
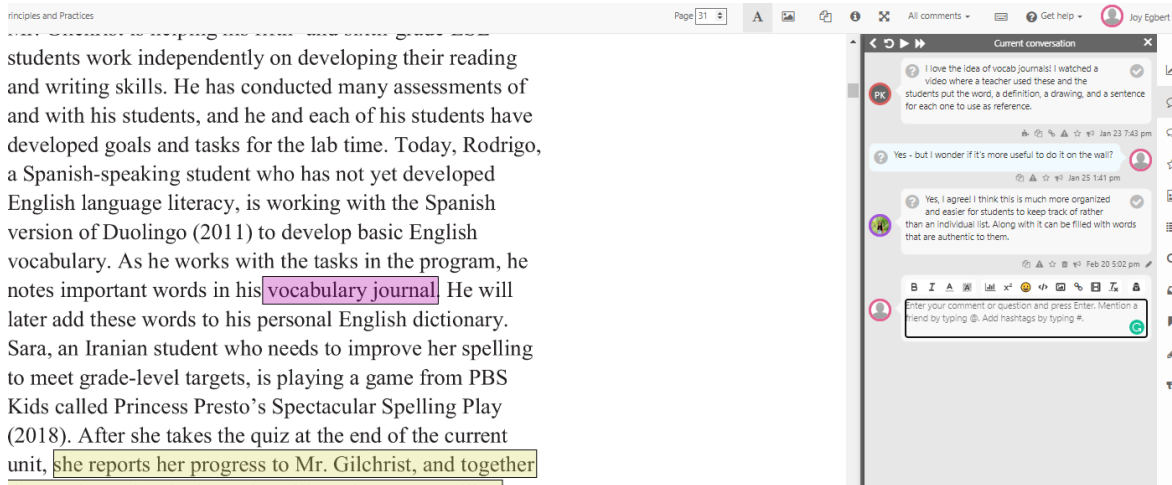
Prior to their first annotation on the textbook, the students practiced annotating the class syllabus. Challenges with the technology and questions about its use were addressed during this session.

In addition to writing reading objectives at the start of each chapter in the text, the instructor primed the DSR discussion (Tate & Warschauer, 2022) with the following suggestions for annotating in the app:

> While you read, you can:
>
> 1. Note something interesting to you or that you want to remember.
>
> 2. Point something out to your peers.
>
> 3. Ask a question to your peers and/or teacher.
>
> 4. Request that something be discussed in class.
>
> 5. Note new vocabulary words.
>
> 6. Reply to a peer or the teacher.

The instructor also encouraged students to pick out words from the readings for a classroom word wall to use as they talked about CALL.

When being introduced to Perusall for this course, participants who had used it in previous courses said they had balked at annotating a required number of times. They felt it was inauthentic and distracted from the reading if they had to make questions or comments that they did not actually have and then read the same comments from others. The instructor, therefore, asked students to comment or ask a question at least one time for each reading. Initial online annotations were required three days before the in-class meeting so that the instructor and students had time to think and reply, and students could add additional annotations any time before the start of each class. There was no minimum word limit, but the instructor demonstrated the expectation as saying more than just "I agree" or "good idea." The Perusall assignment was 15% of the overall course grade. Students received full points for the assignment by completing the annotation on time and by contributing at least one annotation that the instructor considered as having some substance.

Data Sources and Analysis

Four sources of data were employed to answer the questions in this study. These included: (a) analytics from Perusall, (b) participant highlights, (c) participant annotations, and (d) instructor notes.

Analytics

For this study, Perusall provided both the numbers and averages in relevant categories (e.g., number and range of annotations, upvotes, active reading time). However, cumulative counts over all participants had to be manually calculated, as they were not provided in the app.

Highlights

Highlighted text consisted of the items in the reading texts to which students responded. All highlighted text in the chapters in Perusall was compiled and downloaded. Then, as Boeije (2009) recommends, all highlighted passages were read and reviewed to obtain an overall sense of the data, then the highlighted passages were coded by two raters (the second author and a staff member from a different university). The raters agreed on four categories to account for the emergent themes in the highlighted text:

1. Conceptual (e.g., definition, background statement, theoretical principle)
2. Practical implementation (e.g., what teachers should do and/or how)
3. Computer application (e.g., defines or explains which app to use)
4. Teacher story/classroom scenario (e.g., "I remember in my second grade class when…")

The raters normed, independently coded 420 highlighted entries, and discussed their codes. Initial interrater reliability was 91%, which was then reconciled to 100% through discussion.

Annotations

Every individual annotation made during the course was downloaded and read, and the raters agreed on four purposes for annotating that emerged from the participants' annotations (i.e., initial comment, extension, initial question, direct feedback). The annotations were parsed according to meaning units—in other words, sections of one annotation that had different purposes were considered individual meaning units. The raters then coded 819 meaning units according to their purpose. Initial code agreement was 93% with no disagreements on parses. The disagreed codes were reconciled to 100% agreement through discussion.

Instructor Notes

Before each class session, the instructor read all of the comments in Perusall and responded to some. She picked out questions and comments that she felt needed to be discussed at the start of the class session. Sometimes the instructor had the students go back into the app to find a question or comment to address while in class. Then, after each class session, the instructor made notes about what needed further explanation or any changes to the reading process or questions. This facilitated the development of guidelines for DSR use for this context.

Findings and Interpretations

The study findings and interpretations are presented in the order of the research questions. This organization helps to build the narrative in a logical way.

CALL TESs' DSR Use

Table 1 shows the overall number of annotations for the text and the breakdown by week and chapter. The numbers in Table 1 show that, on average, students annotated more than the one substantial comment that was required. These results are similar to Lazzara and Clinton-Lisell's (2022) study in that, overall, students annotated far more than the requirement. This indicates that a grade was not the only motivating factor. However, the range of annotations shows that some students posted just once, while others had up to 14 posts on one chapter.

After the initial chapter—where students were getting used to the app and the due dates—annotations generally increased until midterm, when the academic workload increased for all students. However, rather

than not reading at all when they got busy, all of the students still annotated the readings and their involvement with the course text could be seen by the instructor. As Woodward & Neunabar (2022) note, being able to view this ongoing student activeness may be one advantage of using DSR.

Table 1

Annotations by Reading and Student as Counted by Perusall

Week of the course*	Textbook chapter	Number of participating students**	Total #annotations	Average annotations by student (rounded)	Range of number of annotations for students who posted
2	1	10	39	3	1–10
3	2	11	68	6	1–14
5	3	10	54	5	2–13
7	4	11	50	4	1–10
8	5	11	52	4	1–11
11	6	12	43	4	2–9
12	7	11	34	3	1–8
13	8	11	35	3	1–9
14	9	12	49	5	1–11
14	10	12	12		

Note. *Missing weeks are spring break and weeks that the course text was not used.

**Ns less than 12 are because the visiting scholar did not begin participating until Week 4, and one student had health problems that excused her for parts of the semester.

Further, as shown in Table 2, some of the students read and did not participate, and a few students—according to the analytics—neither read nor annotated on weeks where they were sick or out of town. However, the patterns in this table show that most students did read most of the time, even though they did not always annotate. The instructor can encourage students to read and annotate even when they are absent, as long as they do it before the class time so that others can read and reply to their posts.

Table 2

Students With no Annotations

Chapter	*Did not read	Read but did not annotate
1	0	3
2	0	0
3	0	0
4	0	1
5	0	1
6	2	2
7	0	1
8	0	2
9 & 10	0	1

Note. *Same Ns as Table 1.

Active reading time, shown in Table 3, also shows fairly encouraging results. Perusall defines active reading as when a student moves the mouse or types something at least once every two minutes on the assignment. However, whether Perusall provides an accurate view of reading activity requires closer inquiry.

Table 3

Average Active Reading Time

Chapter	Average Minutes Per Student	Range of Minutes of Average Active Reading (Min–Max)
1	52	8 minutes to 3 hours and 34 minutes
2	73	22 minutes to 1 day, 1 hour, and 6 minutes
3	54	12 minutes to 2 hours and 26 minutes
4	40	8 minutes to 1 hour and 28 minutes
5	35	8 minutes to 1 hour and 11 minutes
6	25	8 minutes to 44 minutes
7	34	6 minutes to 59 minutes
8	29	10 minutes to 1 hour and 6 minutes
9/10	45 (23 per chapter)	8 minutes to 1 hour and 54 minutes

It appears that since all the chapters were in the same format, students might have found it progressively easier over time to find the chapter aspects that were interesting to them and comment on those. However, it might also mean that students may not have been reading as deeply as time went on. Table 2 shows that the average number of annotations dropped as reading time did. Future research is needed to examine these and other possibilities such as disengagement from the process.

At the end of the course, the instructor noted that those students who scored lower on DSR generally also had lower final course grades (exclusive of the DSR grade). This was found in other studies (e.g., Law et

al. 2020), and it makes sense because understanding the course readings was necessary to completing the other graded course requirements. This suggests that DSR participation may be considered an indicator of who needs more attention either with reading or for the class.

Trends in Annotations

Milota (2014) notes that the value that participants give to a particular text can be reflected in what they focus on and respond to. Table 4 shows what parts of the chapters the students in this study highlighted and responded to.

Table 4

Type of Highlighted Text of Student Participants

Type of Text	Number of Times Highlighted
Conceptual (e.g., "CALL as a field covers…")	271
Practical (e.g., "…make sure that the site is published by an association or organization that is trustworthy…")	31
Computer application (e.g., "The help menu provides instructions and scaffolds for different word-processing needs…")	52
Teacher story/Classroom scenario (e.g., "32 students in the lab are working…")	66

In the course text, the conceptual information in the text appeared to be far more valued than the practical guidelines. There are several reasons why this may be true. First, perhaps the graduate students—who participated more—were more interested in the conceptual aspects. This, however, does not account for the large differences in what students highlighted. Alternatively, maybe students focused on these aspects because these were the areas that were newer to them and that they did not know as much about. More likely, because the concepts were applied in class tasks, this information was directly and immediately applicable. Tate and Warschauer (2022) agree that DSR use must be "effectively integrated into instruction" (p. 8) and designing classroom tasks that reflect the textbook concepts and those highlighted in DSR might be one way to achieve effective integration.

Table 5

Type and Number of Annotations (Students and Instructor)

Type of Annotation	Number of Annotations
Initial comment (e.g., "I think this is important…")	357
Extension (e.g., "This is because…")	300
Initial question (e.g., "How as future teachers can we…?")	43
Direct feedback (e.g., "I agree with you, [student name]…")	119

Like Law et al. (2020) and Adams et al. (2022), this study found that many comments started with "simple expressions of agreement" (Law et al., 2020, p. 77). However, as shown in Table 5, in this study, 84% of the annotations were extensions (providing an initial comment and then extending with either personal experience, something learned in another class, or something seen in a classroom). As an example, one student commented "I love this idea!" and then added, "My favorite part of teaching fifth grade was passing along important tasks like this to students…" Like in Thoms and Poole (2018), being able to link personal experiences with text and other students seemed to help students perceive some agency and the opportunity to function as an expert in some respects.

Further, about one third of the comments received feedback, which echoes the findings in Law et al. (2020), who found that the majority of annotations in their study were not replied to. They attribute this to timing of the postings, but it could also be due to students' interest, feelings of community/trust, or other aspects that require further research. In this class, it appears that the participants were interacting more with the text rather than peers (through direct feedback), or that their feedback was stated more obliquely than "Pam, I agree…" It also could be that choosing to comment on the same text without directly addressing the previous annotator indicates implicit agreement about the importance of the highlighted text.

There were rarely more than four comments on any one highlighted passage. This indicates that 12 students were not too many for a single DSR group, as other studies have claimed. Blyth (2014), for example, claims that groups with two to four readers are optimal. Egbert et al. (2022) concluded that at least one of their course groups was too big for all of the students to read all of the annotations, in the current course. In the study, the instructor asked the students if they preferred to do the DSR in smaller groups, but they were sure that they did not. The students said that they wanted to hear everyone's opinion.

Upvotes

Upvotes in Perusall indicate agreement with an annotation and/or encouragement for a specific person. The instructor did not specify that students could or should make upvotes, but she did use upvotes that served as a model of this affordance. The number of student upvotes ranged from two to 18 per chapter in no real pattern. When the 82 upvotes are added to the direct feedback that students generated, this totals over 200 instances of interaction. Although it was not always deep, this feedback could also support class cohesion. As Solmaz (2020) and Burhan-Horasanli (2022) note, DSR use can change class dynamics and make the discussion more focused and useful.

While Law et al. (2020) found that student engagement in class discussions and online discussions was relatively similar, instructor notes in this study showed that students had less to say in class because they

felt that they had already understood the reading online. Once the instructor had addressed questions that several students had upvoted, the students felt that they were ready to apply and extend the information in their class tasks.

Instructor's Role

Sadoughi and Hejazi (2022) claim that the key to student engagement is teacher support. However, the current study showed something a bit different. Table 6 presents the instructor's input in the DSR.

Table 6

Instructor Only Annotations

Type of Annotation	Number of Annotations
Initial comment	5
Extension	26
Initial question	0
Feedback	56
Upvotes	33

Aside from the initial questions asked as part of the DSR task, the instructor was reactive rather than proactive. While not intentional, the instructor observed whether she needed to initiate and found that the graduate students often took the lead in starting conversational streams about teaching experiences, and the undergraduates initiated conversations about theories and concepts that they had learned from other classes. The students seemed to react well to this, perhaps because peers were not seen as authorities to whom they had to reply with a "correct" answer. This may indicate that it is not the instructor per se, as in Law et al. (2020), but a leader of sorts, that can support others while reading and provide a positive model. If the instructor holds back, it may be that students, rather than the instructor, will become discussion leaders and can take the role of upvoting and providing positive feedback to their peers.

Implications and Applications

This study looked at the DSR use of participants in a CALL methods course over one semester to understand the benefits and disadvantages. The instructor felt that the benefits far outweighed the disadvantages in this context.

Many of the benefits found in this study were those already mentioned in the literature, as noted previously. For example, like Burhan-Horasanli (2022), this study concludes that DSR use can allow students opportunities to actively address texts and "benefit from each other's expertise" (p. 9). As Burhan-Horasanli (2022) found, many of the students ended up as knowledge providers, so the DSR use gave them opportunities for agency. In addition, like Broughton (2020), this study found that the use of DSR helped to "extend class time" (p. 195), leaving time in class for active participation when students understood the readings ahead of class. Some disadvantages were also found**.** For example, students did not participate equally. However, some may have participated even less without the DSR. In addition, it is unclear whether, as Michelson and Dupuy (2018) suggest, DSR use supports intentional reflection and greater elaboration than in-class group discussions, but it does appear that it provides the opportunity.

Guidelines

Based on this study, a number of guidelines arose to consider as part of DSR use. These include suggestions mentioned earlier and the following:

1. Listen to how students read and how they like to respond. Requiring that students make five comments and three questions, for example, might not be useful, but they may be willing to respond more than once on an interesting reading. In the current study, the average number of annotations per reading was three or more. The requirement to have only one substantive post allowed students to choose how often they participated without making the task unwieldy or boring.
2. Observe how students participate/annotate. This may help the instructor gauge how interesting and/or accessible the material is. It may also indicate students need more support with the readings and/or class concepts. In the class in this study, the instructor stayed somewhat in the background, and this helped her to see where she might go in her in-class lessons.
3. Actively develop community in the class. Broughton (2020) suggests that students will make an effort with a comfortable audience of their peers. The time that the instructor takes helping students get to know each other in class can carry over into DSR use. In this study, this was evidenced by students often joking, using emojis, and supporting each other.
4. Give students a reason to read. Tate and Warschauer (2022) note that annotations should be used actively in class. In the CALL class, the students knew that the DSR would be addressed. The annotations assisted the instructor in asking useful questions and the students in applying knowledge through the vocabulary wall and other course tasks. In addition, the instructor posted questions in Perusall to notify students which ideas might or should be discussed.
5. Encourage students to give upvotes and direct replies so that the author is notified. Students in this study said they were more likely to respond when someone directly addressed their annotation. Upvoting was not required, but the students took it upon themselves to use upvotes as a way to encourage and agree with their peers.
6. Before taking a direct role, instructors can allow students to take on their preferred roles. Maybe some will lead, and the instructor can model on DSR when necessary and lead as needed during in-class discussions. In this study, the students quickly began to lead with comments that addressed their interests and experiences. Because they were not restricted to answering pre-made questions, they may have been more likely to take initiative and claim ownership of the direction of the annotations.

Future Research

Like Tate and Warschauer (2022), the instructor in this study found that DSR made a noticeable difference in reading assignment completion, vocabulary understanding, and classroom community in general. However, the lack of student voice in this study leaves some questions unanswered. In addition, there are many contexts in which DSR research has not been conducted. Questions for future research include:

- What would happen if instructors encouraged/required users to include external resources (e.g., videos, links) in their annotations?
- How does interaction change if the instructor makes it mandatory to upvote or directly address replies?
- What differences are seen in students' attitudes and participation when they are required to post a certain number of times?
- How do students perceive the use of DSR, and how does this differ in different contexts and disciplines?

Overall, the findings of this study indicate that it is more likely that appropriate task design for the context, rather than context or discipline alone, determines the success of DSR use. This is also a topic for future research.

Acknowledgements

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