Text Chat-Mediated Dynamic Assessment Towards Self-Regulation in Language Learning

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ABSTRACT

Even though the importance of corrective feedback (CF) is widely recognized, there is no agreement on the most effective type of CF for promoting self-regulation. Thus, this study adopts a sociocultural perspective on learning and employs dynamic assessment (DA) as a CF form. DA is considered a theoretically promising approach to CF as it focuses on the learning process rather than the end product. Instead of the common teacher-learner interaction, this study initiates a teacher-learner group interaction with the support of text chat. Text chat helps teachers to cater to all students in the class simultaneously through several chat groups. This longitudinal study was part of an ongoing, university-level three-month English-as-a-second-language course. The findings demonstrate that this collaborative approach facilitates self-regulation through teacher mediation and peer scaffolding, and that the text chat supports implementing DA in the classroom while its features support mediational and reciprocity moves of the DA process.

KEYWORDS

Collaboration, Computer-Assisted Language Learning, Dynamic Assessment, Mediation, Self-Regulation

INTRODUCTION

Dynamic Assessment (DA), which could be considered a blend of both assessment and assistance, has most often been discussed as an alternative strategy for traditional assessment which aims to assess the learners' current level of knowledge (Poehner et al., 2017). DA challenges the conventional view of assessment and presents the argument that teaching and assessment should not be separated but integrated to help learners stretch beyond their current level. However, DA is not only a form

of assessment; it has also been presented in the SLA (Second Language Acquisition) literature as a feedback strategy with the work of scholars like Aljaafreh and Lantolf (1994), and Poehner (2009). They argued that corrective feedback (CF), whether it is implicit or explicit, would focus on the product, not the learning process. Lantolf and Poehner (2011), and Price et al. (2013) reiterated that learning could be best promoted by changing the focus from the product to the learning process. Thus, DA has gained increasing attention in SLA as it focuses on the learning process instead of the product while helping learners to reach self-regulation with graduated and contingent support.

The implementation of DA in the classroom is considered challenging due to the difficulty of facilitating one-to-one interaction between teacher and student (Lantolf, 2012). Computerised Group DA is one approach increasingly used by researchers in recent years to tackle this issue. However, it has been realized that the human mediator is of crucial importance and could not be replaced by a computer application (Tzuriel & Shamir, 2002) and that pre-scripted scales cannot always identify the needs of a learner (Zhang & Lu, 2019). Thus, computerised Group DA has its own limitations. Apart from computerised Group DA, two other approaches have been introduced: concurrent Group DA and cumulative Group DA (Poehner, 2009). In concurrent DA, the teacher starts the interaction with one individual and gives him or her feedback but quickly shifts the focus to the entire class, when a situation arises where that learner's issue, question or struggle make the space for others to contribute. Consequently, the whole class benefits. In cumulative Group DA, each student takes turns for one-to-one interaction with the teacher to complete an activity.

In this study, we used a *collaborative approach* to Group DA, which allows learners to work collaboratively and interact with the teacher as one group. We believe this approach could promote not only teacher mediation but also peer scaffolding. We used text chat as the communication platform for teacher-learner group interactions because text chat has always been appreciated for its ability to implement synchronous communication (Andujar, 2020) and overcome space and time constraints (Andujar & Salaberri-Ramiro, 2021). Text chat has also been discussed as a more effective platform for DA than face-to-face interactions (Kavesh & Rassaei, 2022). Thus, we presumed that text chat would help overcome the challenge of implementing DA in the actual classroom. The three-step regulatory scale developed by Udeshinee, Knutsson, Barbutiu, et al. (2022) was used by teachers to provide feedback to the learner group. This scale was employed in the study because it is designed for the text chat platform and combines both interventionist and interactionist approaches.

Using sociocultural theory as it promotes praxis (an integration of theory and practice) (Lantolf, 2012), the present study examines how DA could be implemented in the ESL classroom setting using collaboration between student groups and teachers.

THEORETICAL BACKGROUND

Dynamic Assessment

This study is informed by one of the central tenets of Vygotsky's Sociocultural theory, dynamic assessment (DA). DA is a process that dialectically integrates instruction and assessment that provides graduated support to learners (Poehner, 2007). Through DA, the mediator can explore the learner's Zone of Proximal Development (ZPD), the distance between learners' independent performance and assisted performance. According to Vygotsky, to assess the full cognitive abilities of the learner, both their actual and potential development should be assessed(Vygotsky, 1998), and DA is the means to achieve this goal. This assessment could be done only through mediation and reciprocity; two sides of the same coin of DA (Grigorenko, 2009). Through mediation, the mediator can instruct the learners, while learners' responsiveness or reciprocity will help mediators assess the learners and determine their potential abilities.

We use DA in this study as a form of feedback strategy rather than a form of assessment. We focus on the learning process rather than the end product because DA as a form of feedback strategy can

promote self-regulation. Self-regulation refers to "one's ability to plan, monitor, check and evaluate their own performance" (Lantolf, 2011, p. 25) and could be of three forms: complete self-regulation (learner repair with no assistance), partial self-regulation (learner repair with assistance) and other regulation (other repair) (Aljaafreh & Lantolf, 1994). Self-regulation can lead to learner autonomy (Lai, 2022) which is considered as someone's ability to take responsibility and control their learning (Holec, 1981). When learners are given more responsibility for their own learning, they tend to engage more in the learning process (Little, 1991). Little (1990) argues that learner autonomy is not only about working on one's own but also about working collaboratively with others in a collaborative context. Thus, learner autonomy is both an individual and a collaborative experience (Little, 1991).

Group Dynamic Assessment (Group-DA)

Although early research on DA focused on an individual level, later on, the focus shifted to Group DA as researchers were checking the possibilities of implementing DA procedures in the classroom setting. Poehner (2009) recognises two forms of Group-DA: Concurrent Group DA and cumulative Group DA. In concurrent Group DA, the teacher provides the prompts to one individual, leading to questions for the others. However, the prompt directed at one may not be relevant to the other. Some will reach self-regulation quicker than others. This challenge is somewhat addressed by the other approach, cumulative Group DA. Here, the teacher provides a prompt to individual learners; it is expected that the prompt directed at one individual may impact another. This appears to be one-to-one interaction, but the other learners, though they may remain silent, are engaged as secondary interactants. Thus, it is believed that this type of interaction has the potential to mediate the thinking of others as well.

When DA is applied to a group, the mediator must determine the learners' baseline level of performance and provide assistance and instruction that should benefit the entire group (Davin & Gómez-Pereirab, 2019). However, this process might be challenging if the learners have different ZPDs (Davin & Gómez-Pereirab, 2019). To solve this problem, we suggest an approach in which the group is considered "not merely a context for individual performance, but a social system in its own right" (Poehner 2009, p. 477). This approach could help learners collaborate and move forward in group ZPD as a collective activity. Thus, apart from the mediation and reciprocity in the collaborative dialogue between the teacher and the learners, this approach allows scaffolding among learners during their collaborative work. We would like to call this approach *collaborative group dynamic assessment*. This would differ from the other two approaches to Group DA, concurrent Group DA and cumulative Group DA. Thus, the present study will contribute to the theoretical and pedagogical discussions on Group DA and collaborative learning in the CALL context.

POSITIONING OF THE PRESENT STUDY IN THE EXISTING LITERATURE

In previous literature, it seems that only a few Group DA studies have been conducted so far (Afshari et al., 2020; Bakhoda & Shabani, 2019a; Davin, 2013; Ebadi et al., 2018; Estaji & Saeedian, 2020; Kamrood et al., 2021; Lantolf & Poehner, 2011; Poehner et al., 2015; Qin & Zhang, 2018; Yang & Qian, 2020). Although DA-based research on SLA has increasingly evolved during the last two decades (Afshari et al., 2020), there is still more to be explored in implementing DA in the ESL classroom, mainly because the implementation of DA in the actual classroom is still challenging (Lantolf, 2012). Although several approaches (computerised Group DA, concurrent Group DA and cumulative Group DA) have been suggested to overcome this challenge, we believe the present study will significantly contribute to the research scholarship and pedagogy for several reasons.

First, most of the group DA research on the use of DA in the classroom has used a computer application as the mediator (Bakhoda & Shabani, 2019b, 2019a; Davin, 2013; Ebadi et al., 2018; Qin & Zhang, 2018; Yang & Qian, 2020). DA studies that use a teacher as a mediator are fewer. Second,

it is doubtful whether the concurrent Group DA approach could fully or equally support the entire class. A prompt directed at one learner will not be able to help another if they have different ZPD levels. There is a potential that at least some may not benefit at all if they have less motivation. Third, in the cumulative Group DA approach, it is expected that the mediation provided to one learner will impact another in the group. Therefore, teachers face challenges in determining a baseline performance for the group and providing instruction and assistance that would benefit the entire group in the same way. However, to our knowledge, there are no studies that use groups that work collectively to respond to the teacher. Such group work could also promote peer learning, an essential attribute for learning (Price et al., 2013). Thus, the present study contributes to filling these gaps in SLA and CALL literature by exploring the implementation of *Collaborative Group DA* in the ESL classroom.

The collaborative approach to Group DA presented in this study allows students to respond collectively to the teacher. The teacher mediates with the entire group as one unit, allowing all members of the group to discuss and understand. Here, the teacher's mediation helps the entire group to move forward in their ZPD as a collective activity. Therefore, we call this approach *collaborative Group Dynamic Assessment*, which paves the path for both co-thinking and co-understanding of leaners.

The present study seeks to answer the following research questions:

How could dynamic assessment be used to promote learner development in the English as a Second Language classroom?

How could text chat support the dynamic assessment process?

METHODOLOGY

Research Context

The study was carried out at a university in Colombo, Sri Lanka. This study was integrated into an on-going three-month English course which was offered to a class of 25 students whose English proficiency ranged from A1 to B1 (Common European Framework of Reference for Languages). These students were studying in their second semester of the first year; therefore, they had known each other for at least six months. A designated four-hour weekly time slot was dedicated to this module, of which two hours were specifically assigned to the text chat sessions between teachers and student groups that would be the focus of this study. These text chat activities focused on the fundamental usage of the simple present and past tense, aligning with the classroom lessons.

The students were aged from 18 to 22 years, and all except one were female. They had learned English over a minimum period of ten years. This class was taught by two female ESL teachers. One teacher, aged 34, had at least ten years of experience teaching English to adult learners. She had a bachelor's degree in English and a masters in Linguistics. The second teacher, who was 26 years old, had a minimum of three years of English teaching experience. She also held a bachelor's degree in English and was currently pursuing a master's in TESL (Teaching English as a Second Language). All the participants were employed in the study only after obtaining their informed consent.

The Study Design

The instructional process employed by teachers to offer feedback to learners involved the use of the three-step regulatory scale developed and tested by Udeshinee, Knutsson, Barbutiu, et al. (2022) (Figure 1).

Teachers were instructed to assist learners with their erroneous language production. The intention was to promote learner autonomy by enabling them to reach self-regulation. However, as Figure 2 indicates, if the learner fails to produce the correct response following the initial two prompts, the teacher must provide the correct form with explanations. This scale was used as it is a combination of both interventionist and interactionist approaches and it has already been tested for the text chat platform (Udeshinee, Knutsson, Barbutiu, et al., 2022).

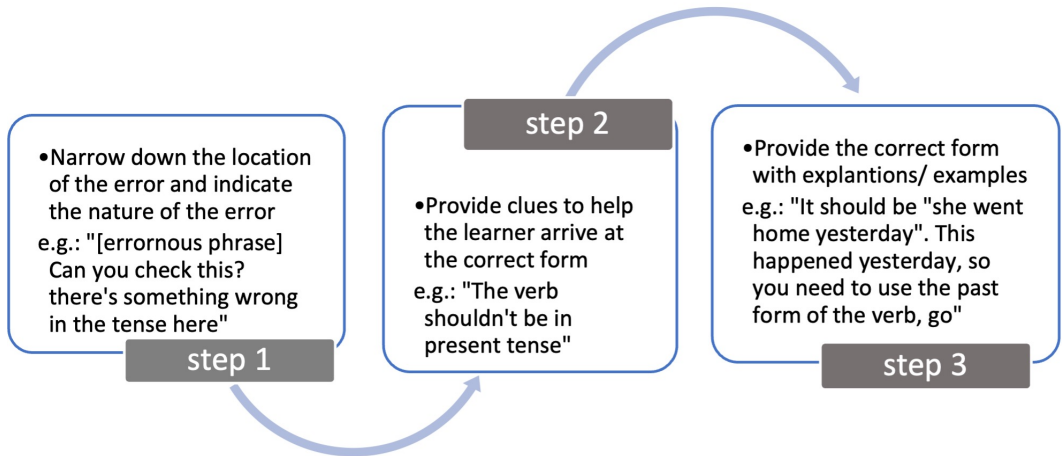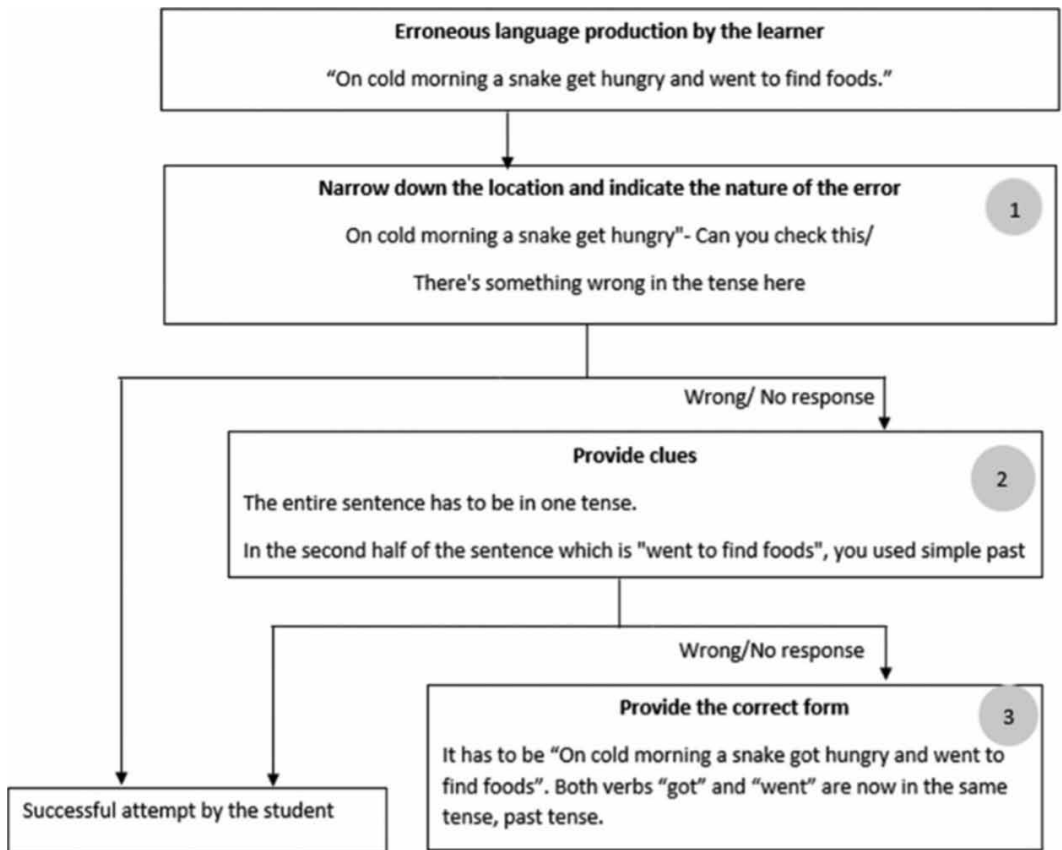**Figure 1. The three-step regulatory scale (Udeshinee et al., 2022)**

- Narrow down the location of the error and indicate the nature of the error
  e.g.: "[errornous phrase] Can you check this? there's something wrong in the tense here"

step 1

step 2

- Provide clues to help the learner arrive at the correct form
  e.g.: "The verb shouldn't be in present tense"

- Provide the correct form with explantions/ examples
  e.g.: "It should be "she went home yesterday". This happened yesterday, so you need to use the past form of the verb, go"

step 3

Figure 2. Mediational moves in the three-step regulatory scale (Udeshinee et al., 2022, p. 15)

Erroneous language production by the learner

"On cold morning a snake get hungry and went to find foods."

Narrow down the location and indicate the nature of the error

On cold morning a snake get hungry"- Can you check this/

There's something wrong in the tense here

1

Wrong/ No response

Provide clues

The entire sentence has to be in one tense.

In the second half of the sentence which is "went to find foods", you used simple past

2

Wrong/No response

Provide the correct form

It has to be "On cold morning a snake got hungry and went to find foods". Both verbs "got" and "went" are now in the same tense, past tense.

3

Successful attempt by the student

Students were divided into six groups (labelled A to F), with each group comprising four students, except for one group, which accommodated five. Each teacher was assigned the responsibility of overseeing three groups simultaneously (Figure 4). The option of creating chat groups is available within the Zoom chat application. Six distinct chat groups were formed by the first author, which in turn allowed the first author to access all the chat groups. These chat groups were labelled A-F, and the teachers were also added to their respective chat groups.

A dictogloss activity focusing on grammatical notions of present/past tense was used as the task. Dictogloss is a type of supported dictation where the teacher reads a short, curriculum-related text several times and the learners try to produce their own version as close to the original as possible. A dictogloss activity was used as it helps more language production and the three-step regulatory scale has been developed aligning to dictogloss activities (Udeshinee, Knutsson, Barbutiu, et al., 2022). Prior to each text chat interaction, one teacher read the story three times to students. Students were required to listen to the story and subsequently retell it to the teacher in their own words during the text chat session. Instead of sending the entire story at once, students were asked to send the story sentence by sentence, thereby affording the teachers the opportunity to provide feedback on each sentence individually. Consequently, the students waited for the teacher's response and moved to the following sentence only if their preceding sentence was correct. In order to facilitate this interaction, Zoom (https://zoom.us) was used as the mediating tool due to its recognition in promoting learner autonomy and enabling authentic language experience (Chen, 2022; Lenkaitis, 2020). Most of the time, participants were using computers to connect with Zoom, but there were also instances where some students were using their smartphones. It should be noted that the text chat platform used in this study was a separate Zoom chat platform in the Zoom app and that it is different from chatting in the video conferencing room. This special Zoom chat platform facilitates the creation of different chat groups, and the members do not have to be in the video conferencing room to use the chat. This chat platform is depicted in Figure 3.

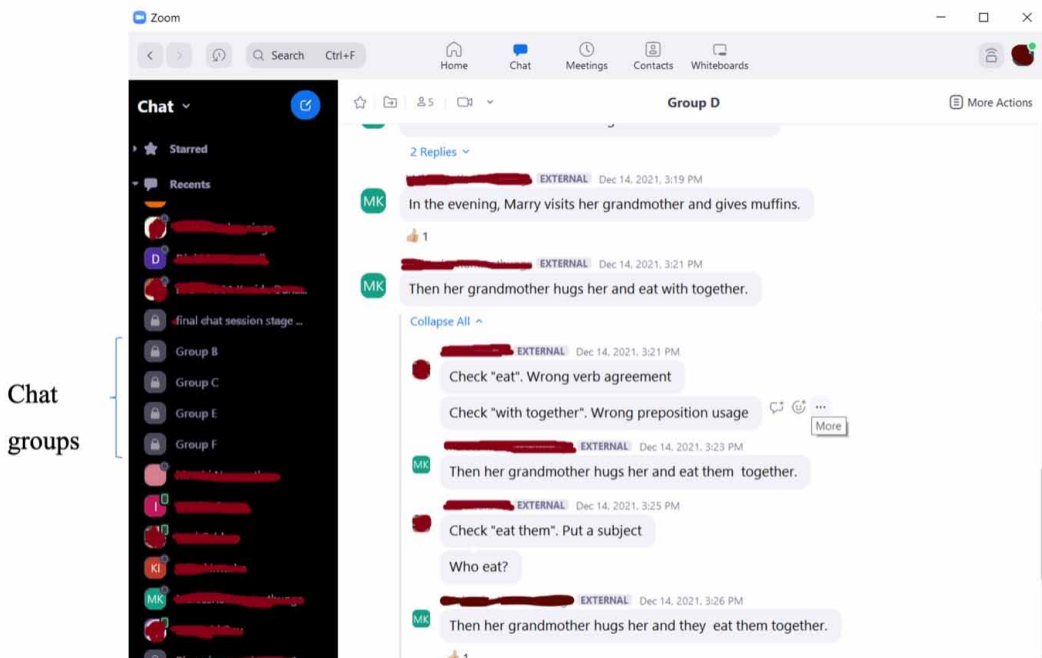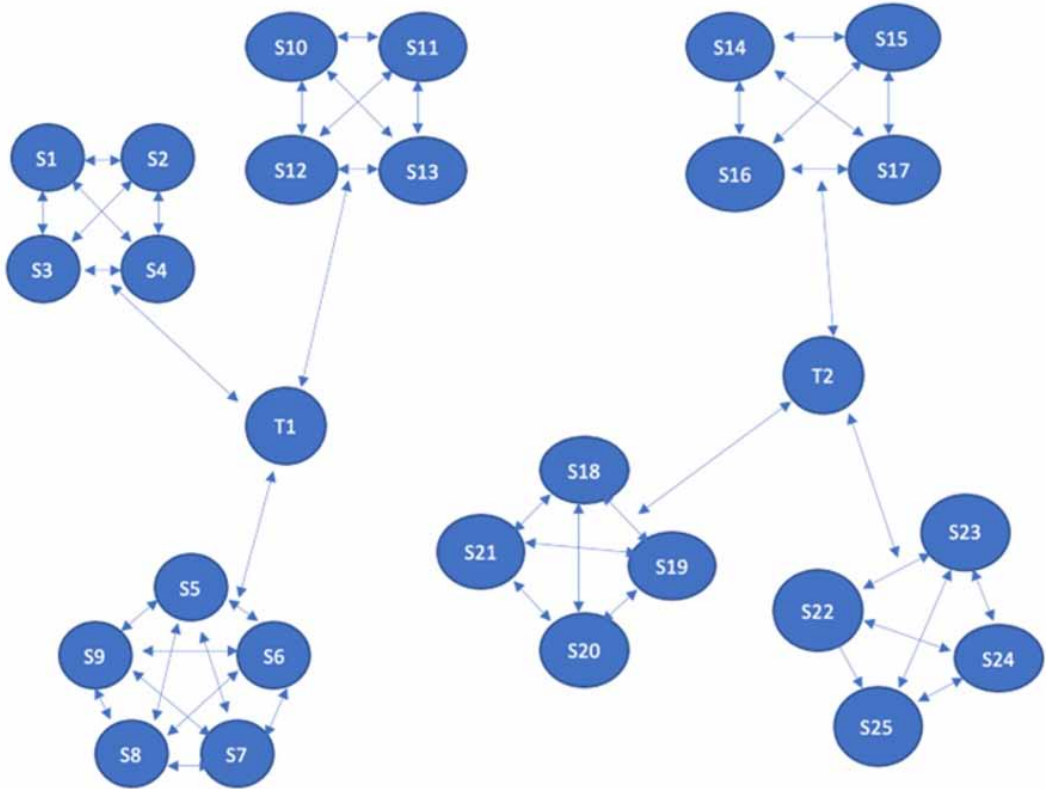**Figure 3. An extract from the text chat interaction between the teacher and Group D**

Figure 4. A visual representation of the classroom setting

Due to the country's Covid-19 situation, at the beginning of this study, some students joined the interaction online while some were in the physical classroom. The online participants had discussions with their group members through a virtual meeting, while those attending the physical class engaged in face-to-face discussions. However, as the study progressed, and the Covid-19 situation improved, all students attended the sessions in person; they sat in groups, discussed and completed the activities. The teachers were also present in the same physical class setting; thereby enabling direct observations of the students during the text chat interactions. However, teachers' mediation took place only via the text chat platform, while the students' discussions were oral.

Unlike many previous studies on group DA, this study employs a distinctive study design that facilitates learners in each group discussing with each other before responding to the teacher. Consequently, though only one student is typing the response on the chat interface, the response was a collective effort. It should also be noted that the same number of students was not available for every session due to internet connectivity issues (when online participation was necessitated by the pandemic) and occasional instances of absenteeism. When there were such issues, the group had fewer members, but throughout, they had at least two students in the group. The Table 1 illustrates how the preparatory work was conducted during the initial four weeks.

In the third week, students were given an individual dictogloss activity with the purpose of enabling teachers to assess the learners' actual performance while simultaneously training students for a dictogloss activity. After the preparatory stage, the text chat interactions were conducted (Table 2). The first interaction occurred in the fourth week after training the students to use the Zoom chat platform.

Table 1. The study design: Preparatory work

Week	Activity	Responsibility	Duration of the Activity	Details
1	Workshop for teachers	First author	45 minutes	Training Teacher 1 and Teacher 2 to use the three-step regulatory scale
2	Teaching present tense	Teacher 1	Two hours	Making students aware of the accurate form and the usage of simple present tense
3	Dictogloss activity on present tense	Teacher 2	30 minutes	Individual dictogloss activity in the class
4	Workshop for students on Zoom interaction	First author	30 minutes	Training students to use the Zoom chat platform

Table 2. The study design – text chat interactions on present tense

Week	Activity	Responsibility	Duration of the Activity	Details
4	Text chat session 1 (present tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Yilmaz & Granena, 2010) See Appendix 1
5	Text chat session 2 (present tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Yilmaz & Granena, 2010) See Appendix 2
6	Text chat session 3 (present tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Calzada & Mayo, 2020) See Appendix 3
7	Text chat session 4 (present tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Calzada & Mayo, 2020) See Appendix 4

In the sixth week, students also received explicit instruction on the simple past tense covering the correct form and the usage of the form. Subsequently, in the seventh week, an individual dictogloss activity focusing the past tense was administered to the class, affording teachers an opportunity to assess students' level of performance in this tense. Then, from the eighth week continuing until the eleventh week, text chat interactions were conducted focusing on the past tense (Table 3).

Table 3. The study design: Text chat interactions on past tense

Week	Activity	Responsibility	Duration of the Activity	Details
8	Text chat session 5 (past tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Wajnryb, 1990) See Appendix 5
9	Text chat session 6 (past tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Wajnryb, 1990) See Appendix 6
10	Text chat session 7 (past tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Wajnryb, 1990) See Appendix 7
11	Text chat session 8 (past tense)	Teacher 1/ teacher 2	2 hours	Dictogloss activity (Ellis et al., 2019) See Appendix 8

Following the completion of the text chat sessions, in the twelfth week, another individual dictogloss activity was administered to the class focusing on both present and past tenses to evaluate the progress made by students in the use of these tenses. During the same week, individual and focus group interviews were held with teachers and students respectively, to obtain their perspectives on implementing this *collaborative Group DA* in the classroom. The timeline of this study is indicated in Figure 5. However, because of the extensive amount of data obtained, this study is limited to the analysis of text chat and oral conversations.

Data Collection and Analysis

Qualitative data for the study were drawn from two sources: text chat interactions between teachers and student groups and oral discussions of students during these text chat interactions. However, certain groups were absent from some sessions (Group A did not take Session 2, Group B did not take Session 5, and Group E did not take sessions 5 and 6). As a result, the data was collected only from 44 sessions. It should also be noted that students' discussions of only first four sessions were recorded as it was challenging to collect such a voluminous amount of data.

Collected data were analysed using conversation analysis (CA) as it would help examine the naturally occurring interactions. Following the guidelines suggested by Ellis & Barkhuizen (2005), the initial step involved identifying separate sequences in interactions and delineating the actions with those sequences. The initiation of a new sequence was demarcated by students' introduction of a new sentence, while the teacher's confirmation of its accuracy or her provision of the correct form marked the end of the sequence. Within these sequences, various actions occurred including teachers' prompts (steps of the scale) and learners' attempts to produce the correct sentences. An example of how the analysis was done using the guidelines is indicated in Figure 6. Group discussions were transcribed using Jefferson transcription conventions (Stivers & Sidnell, 2013).
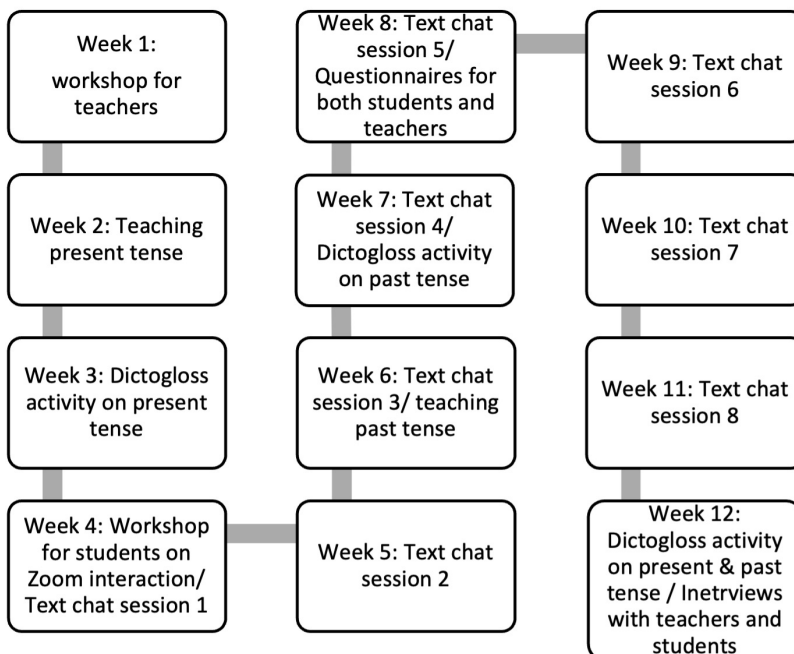
Figure 5. The timeline of the study throughout 12 weeks

Figure 6. An example of the conversation analysis

				1/2.Identifying sequences/characterisation of actions	3.Identifying actions	4.Time/ turn taking	5.Role	6.Putting it altogether
1	S1	One day early bright, at 7 o' clock a junior goes to fishing.	14.54	Beginning of the sequence/ sentence 1	Erroneous sentence	Learners take the turn to produce the sentence	Learner – responsive	All the three steps have been used
2	T	Hey please check "One day early bright". Something is not right with prepositions and nouns!	14.55	Step 1- indicating nature and the location of the error	mediation	Mediation in 1 minute	Teacher- mediator	Reciprocity moves and the time taken for turn taking by the learners show that learners cannot understand the error Results in other regulation
3	T	Also, refer to this child as "little boy". This is not Junior 😊	14.56	Continuation of step 1/ uses an emoji	Mediation/ tries to be friendly using an emoji	More mediation in 1 minute	Teacher- mediator	
4	S1	correction: One day early in the morning, at 7 o' clock a little boy goes to fishing.	14.59	Attempt 1	Reciprocity- incorporating feedback to a certain extent	Response in 3 minutes	Learner – responsive	
5	T	Check "goes to fishing". Something wrong with preposition!	14.59	Step 1-repetition of the step 1	mediation	Mediation in the same minute	Teacher- mediator	
6	S1	Correction: One day early in the morning, at 7 o' clock a little boy goes for fishing.	15.05	Attempt 2	Reciprocity- incorporating feedback, still erroneous	Response in 6 minutes- Difficult for learners to regulate	Learner- responsive	
7	T	Do we need to use a preposition there? Check again!	15.06	Step 2 — providing a clue	mediation	Mediation in 1 minute	Teacher- mediator	
8	S1	correction: One day early in the morning, at 7 o' clock a little boy goes to fishing. Mam, can you explain what is the error.	15.11	Attempt 3	Reciprocity move- seeking for assistance	Response in 5 minutes- Difficult for learners to regulate	Learner – responsive	
9	T	We don't have to say "goes to fishing". We can just say "goes fishing". No need to put a preposition there!	15.12	Step 3- providing the correct form	Mediation- understands the learners' difficulty to arrive at the correct for, so providing the correct form	Mediation in 1 minute	Other regulation	
10	S1	ok mam. thank you	15.13	response/ end of the sequence	Reciprocity – accepting mediation	Response in 1 minute		

FINDINGS

The present study explored how a *collaborative group dynamic assessment* (collaborative Group DA) aligning with the group ZPD could promote language learning in the ESL classroom via a text chat platform. The study yielded three key findings. First, the findings revealed that the collaborative Group DA approach facilitates not only the teacher's mediation but also peer scaffolding. In this approach, if the teacher's mediation could approach the ZPD of only one learner in the group, that learner's mediation would help co-construct the group ZPD. Thus, the teacher can take the entire group forward in their group ZPD. Second, it was discovered that teachers and students used text chat features as mediational and reciprocity moves. Third, the text chat helped the implementation of DA in the classroom by helping teachers to collaborate with several groups of students simultaneously via different chat channels. These findings will further be elaborated on in the following section.

Collaborative Group DA: Teacher Mediation and Peer Scaffolding

In cumulative Group DA, the teacher mediation adapts according to individual language needs of different students. Conversely, in concurrent Group DA, the teacher interacts with one student and takes that interaction to the entire class. However, in the case of this study, the teacher's mediation is offered to the entire group, that results in a group ZPD which is co-constructed in collaboration with all group members. Therefore, we suggest this approach be called a *collaborative approach* where the collaboration is twofold: between the teacher and the learner group and among members within the learner group. Figure 7 presents the interaction between the teacher and the learner group, while Figure 8 depicts the interaction among learners in the group during the time of the interaction illustrated in Figure 7.

Figure 7 shows learners' production of a sentence with an error, and how the teacher uses step one to provide mediation. Figure 8 shows how learners collaborate to assist each other in completing

Figure 7. A sequence from text chat interaction of Group C, day 4

```
1  S1  After she decorate      15.25
       her cake with melted    (EDITED)
       chocolates.
2  T   There's a slight        15.27      Step 1
       grammar erroe
3  T   error                   15.27
4  S1  After she decorates     15.27      Attempt    Self-      Repairs
       her cake with melted               1          repair     within
       chocolates.                                               the
                                                                 same
                                                                 minute
5  T   Correct                 15.28
```

Figure 8. A sequence from the oral conversation among Group C members, day 4

```
1  S1  Ho ho ho a new message (.)                Noticing the
                                                  teacher's prompt
       Wait wait wait a new message (.)

2  S2  After six o'clock, comma                  Preparing the next
                                                  sentence

3  S3  Ey e?                                      Attempting to
                                                  realize the error
       Why is that?

4  S1  ((reading))There is a slight grammar error Reading the
                                                  teacher's prompt

5  S1  ((reading)) After she decorate the cake with Reading the
       (.)                                        sentence again

6  S4  Decorates ↑                                Correcting the
                                                  error
                                                  Other initiated
                                                  self-repair

7  S1  Ah decorates ↑                             Noticing the
                                                  error/ understand
                                                  the correction
       Oh decorates

8  S4  Man beluwe nethnam balannema neh oyala neh Post-repair
                                                  comment
       I    check    no    check    no   you   right
       If I don't check, you guys never check
       right?

9  S1  Eyata s ekath ekka monada ganudenuwak      Post-repair
       thiyenawa                                  comment
       She    s    one    with   some   issue
       have
       She has some issue with the "s"
```

the task. Student 4 corrects it, and then the others understand. In line 9 in Figure 8, student 1 is even commenting on the error that student 3 is making repeatedly. The teacher's mediation could be grasped only by one learner; this means the teacher addresses the ZPD of only one learner, but that learner assists the other learners to co-construct a group ZPD. Then, the teacher can take the ZPD of the entire group forward. Also, since the teacher's first prompt could be successfully grasped by one learner, she did not have to use the second prompt/step. In this process, since it is not only the teacher's mediation, but the more proficient peer's assistance is also available; thus, the teacher's job became easier, and she could use that time to offer mediation to more groups.

It is also interesting to see that apart from the grammar errors, there were instances where peers corrected the pronunciation errors, which the teacher could not notice as the interaction took place in the text chat platform. When one group member pronounces sugar with the initial "s" sound, another member corrects it saying it should be the "sh" sound. Their collaboration also proved beneficial in assisting each other with new vocabulary. There were also instances where the peers explained certain grammatical features to each other. One such occasion is depicted in Figure 9.

This shows that mediation and reciprocity moves occur even among peers. In line 3, student 3 asks a question from the others, and student 4 becomes a mediator in this occasion, providing assistance. In line 5, student 3 repeats the correct version to confirm her understanding. This repetition could be seen throughout in the interactions where learners were trying to internalise what they learnt. Further, the learners' use of their first language, Sinhala, can also be seen in this interaction. Although using the first language could not be encouraged in this learning context, it seems important for them to continue the collaborative dialogue. However, this example shows that *collaborative Group DA* not only allows the teacher but also the peers to be of help and that it supports leaner development.

Figure 9. A sequence from the oral conversation among Group C, day 4

```
1    S1    Granny eyawa dekala godak sathutu una         Telling what
                                                         happened in
                                                         Sinhala
           Granny her    saw    very   happy    was

           Granny was very happy to see her


2    S2    Granny:: wa::s happy: to see:: her            Translating
           daughter:                                     that into
                                                         English


3    S3    Was to be wennedda? Eya sathutu bawata path   Seeking for
           una                                           assistance
                      become   she    happy     became
           Isn't it was to be? She became happy


4    S4    Sathutu bawata kiyala ekak neh. Sathutu.      Providing
                                                         mediation
           Happy    to be         one   no   happy
           There's nothing as to be : was happy:


5    S3    Granny was happy to see her daughter.         Repeating the
                                                         correct
                                                         sentence/
                                                         internalizing
                                                         the correct
                                                         form
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Signs of Language Development through Group Dynamic Assessment

Table 4 indicates that there was a considerable number of sequences wherein learners achieved complete self-regulation.

Table 4 indicates that the highest percentage of complete self-regulation can be found in group E, while the least percentage of complete self-regulation is found in group C. As complete self-regulation allows the learners to get control of their language production, we could assume that group E could be better in their learner autonomy. However, these findings indicate that there is possibility for collaborative group DA to promote self-regulation.

Use of Text Chat Features as Mediational and Reciprocity Moves

The second research question of the study aimed to address how the text chat features would support the implementation of Group DA in the ESL classroom. In this dialogic interaction, both mediation and reciprocity are essential. Drawing upon Poehner's (2008) metaphor, this interaction should look like a "dance" necessitating active involvement of both parties. Findings of our study indicated that both teachers and learners used emojis, reactions and GIFs (graphics interchange format images) for mediation and reciprocity. It is noteworthy to observe how these features were incorporated by both parties during the teaching/learning process. A summary of the text chat features used throughout all the sessions is given in Table 5.

Table 4. The frequency of complete self-regulation

	Teacher 1			Teacher 2		
	A	**B**	**C**	**D**	**E**	**F**
Complete self-regulation	45	37	27	54	57	41
No of sequences	67	66	80	95	81	85
% of complete self-regulation	67	56	34	57	70	48

Table 5. Mediational and reciprocity moves through emojis

Learners used emojis as reciprocity moves to remind the teacher to send the feedback helping her identify any group she may have missed responding to. Given that she was managing three groups simultaneously, this practice would have helped her. Learners used emojis when they encountered the challenge of comprehending the feedback. Perhaps, it was probably easier for them to express themselves using emojis and reactions instead of text. Further, when they are unsure of their production of the language, they use certain emojis. These emojis help teachers understand learners' ZPD. Many GIFs and emojis have been used to express their sadness when they fail to reach self-regulation. This also indicates that learners prefer self-regulation to other regulation. The emojis they use when their response is correct is an indication of their happiness and sense of accomplishment upon achieving self-regulation. Teachers also used text chat features as a strategy for mediation. When the learners produce an accurate utterance, teachers use the 'like' reaction to approve it. This seems to make the DA process easier and quicker for the teacher. Thus, the emojis and reactions available in the text chat platform seem to support the mediation and reciprocity process.

DISCUSSION AND CONCLUSION

This study examined how *collaborative Group-DA* could promote learning in the English as a Second Language (ESL) classroom when facilitated through a text chat platform. The study was integrated into an ongoing three-month ESL course for undergraduates for obtaining an authentic research environment for data collection rather than conducting an experiment. The results of the study revealed three main findings. First, the study revealed that collaborative Group DA does not only promote teacher mediation but also peer scaffolding. The findings of this study corroborate with the assertions made by Davin & Donato (2013) on the importance of peer scaffolding in language learning. This study also supports Li's (2013) claim that learners in a group act as novice learners individually but as experts when they work collaboratively. Although we cannot claim that the learner groups employed in the study were experts in the target language, their collective effort appeared to be helpful. However, there was a clear difference between the teachers' mediation and the peers' scaffolding. In this collaborative interaction, we see mediation as supporting the learner gradually and contingently to reach self-regulation and scaffolding as supporting the learner by a more capable peer to complete the task (Lantolf & Thorne, 2006). As Davin & Donato (2013) explain, scaffolding could occur in a dialogic interaction among peers who attempt to collectively accomplish tasks that they might not be able to carry out individually. The findings of this study also corroborate with that of Davin and Donato (2013) as they present two features of assistance in peer scaffolding: the use of repetition and the use of the learners' first language.

The second finding of the study is that both teachers and learners used text chat features as mediation and reciprocity moves. Although no previous study, to our knowledge, has discussed the text chat features such as emojis as mediation and reciprocity moves, a substantial body of literature has examined the impact of feedback with emojis on learners' positive emotions (e.g., Aritajati & Rosson, 2021; Chen & Hsu, 2022; Udeshinee, Knutsson, Barbutiu, et al., 2022) which in turn leads to enhanced learning outcomes (e.g., Chen et al., 2022). However, teachers' reactions (thumbs up) and emojis made their role as mediators easier and quicker. Further, the emojis used by learners helped teachers understand students' group ZPD. Thus, it was easier for teachers to comprehend learners' abilities and for the learners to express their concerns.

Third, the findings of this study also showed the feasibility of implementing DA in the classroom with the use of text chat. This study employed an approach where a teacher could collaborate with three learner groups simultaneously via three chat channels. Thus, this study contributes to computer assisted language learning literature by demonstrating how DA could be implemented in the CALL context.

The findings of the study confirm the results of many DA studies (e.g., Ableeva, 2010; Aljaafreh & Lantolf, 1994; Davin, 2013; Poehner, 2009; Zhang & Lu, 2019) on the support of DA for learner

development. However, our intention is not to propose the replacement of teaching in the ESL classroom with this activity but rather to suggest its inclusion as an additional and supportive activity. Further, this type of activity can be extended beyond the classroom to overcome limitations related to time and space. As a suggestion for implementation, we would like to recommend that both teachers and students must be well trained to use the Zoom chat platform beforehand. Further, teachers should be given a thorough training on providing CF using the three-step regulatory scale.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study employed only female students except for one. Female are known to use more emojis in text chat conversations (Miao & Tian, 2022) and that may have affected the results of the study. Future studies may involve a more gender balanced sample to achieve a more comprehensive and balanced understanding of learner development. As learning is an individual process, it is difficult to generalise the findings of the study to all ESL classrooms. Another limitation of the study was the inconsistent participation of learners in the class. However, we believe that it is the nature of an actual classroom that it is difficult to control students' attendance. The present study employed only written prompts for mediation. Thus, it would also be interesting to examine a blend of both written and oral feedback using the same scale when implementing Group DA in the ESL classroom. However, successful implementation of group DA would require adequate training of teachers in advance to ensure that they are familiar with the regulatory scale and the technology used. Moreover, the inclusion of this approach in the curriculum and teacher training workshops seem to be potential domains for future research.

COMPETING INTERESTS

The authors of this publication declare there are no competing interests.

FUNDING STATEMENT

REFERENCES

Ableeva, R. (2010). *Dynamic Assessment of Listening Comprehension in Second Language Learning*. The Pennsylvania State University. https://etda.libraries.psu.edu/files/final_submissions/5374

Afshari, H., Amirian, Z., & Tavakoli, M. (2020). Applying group dynamic assessment procedures to support EFL writing development: Learner achievement, learners' and teachers' perceptions. *Journal of Writing Research*, *11*(3), 445–476. doi:10.17239/jowr-2020.11.03.02

Aljaafreh, A., & Lantolf, J. P. (1994). Negative Feedback as Regulation and Second Language Learning in the Zone of Proximal Development. *Modern Language Journal*, *78*(4), 465–483. doi:10.1111/j.1540-4781.1994. tb02064.x

Andujar, A. (2020). Mobile-mediated dynamic assessment: A new perspective for second language development. *ReCALL*, *32*(2), 178–194. doi:10.1017/S0958344019000247

Andujar, A., & Salaberri-Ramiro, M. S. (2021). Exploring chat-based communication in the EFL class: Computer and mobile environments. *Computer Assisted Language Learning*, *34*(4), 434–461. doi:10.1080/09588221.20 19.1614632

Aritajati, C., & Rosson, M. B. (2021). Smile! Positive Emojis Improve Reception and Intention to Use Constructive Feedback. In K. Toeppe, H. Yan, & S. K. W. Chu (Eds.), *Diversity, Divergence, Dialogue*. Springer. doi:10.1007/978-3-030-71292-1_21

Bakhoda, I., & Shabani, K. (2019a). Bringing L2 learners' learning preferences in the mediating process through computerized dynamic assessment. *Computer Assisted Language Learning*, *32*(3), 210–236. doi:10.1080/095 88221.2018.1483950

Bakhoda, I., & Shabani, K. (2019b). Enhancing L2 learners' ZPD modification through computerized-group dynamic assessment of reading comprehension. *Innovation in Language Learning and Teaching*, *13*(1), 31–44. doi:10.1080/17501229.2017.1286350

Calzada, A., & Mayo, M. (2020). Child EFL learners' attitudes towards a collaborative writing task An exploratory study. *Language Teaching for Young Learners*, *2*(1), 52–72. doi:10.1075/ltyl.19008.cal

Chen, J. (2022). Effectiveness of blended learning to develop learner autonomy in a Chinese university translation course. *Education and Information Technologies*, *27*(9), 12337–12361. doi:10.1007/s10639-022-11125-1

Chen, Y.-J., & Hsu, L. (2022). Enhancing EFL Learners' Self-Efficacy Beliefs of Learning English with Emoji Feedbacks in CALL: Why and How. *Behavioral Sciences (Basel, Switzerland)*, *12*(227), 227. doi:10.3390/ bs12070227 PMID:35877297

Chen, Y.-J., Hsu, L., & Lu, S. (2022). How does emoji feedback affect the learning effectiveness of EFL learners? Neuroscientific insights for CALL research. *Computer Assisted Language Learning*, ●●●, 1–24. doi:10.1080/ 09588221.2022.2126498

Davin, K. J. (2013). Integration of dynamic assessment and instructional conversations to promote development and improve assessment in the language classroom. *Language Teaching Research*, *17*(3), 303–322. doi:10.1177/1362168813482934

Davin, K. J., & Donato, R. (2013). Student collaboration and teacher-directed classroom dynamic assessment: A complementary pairing. *Foreign Language Annals*, *46*(1), 5–22. doi:10.1111/flan.12012

Davin, K. J., & Gómez-Pereirab, D. (2019). Evaluating instruction through classroom Dynamic Assessment: A sandwich approach. *Language and Sociocultural Theory*, *6*(1), 6–31. doi:10.1558/lst.38914

Ebadi, S., Weisi, H., Monkaresi, H., & Bahramlou, K. (2018). Exploring lexical inferencing as a vocabulary acquisition strategy through computerized dynamic assessment and static assessment*. *Computer Assisted Language Learning*, *31*(7), 790–817. doi:10.1080/09588221.2018.1451344

Ellis, R., & Barkhuizen, G. (2005). Conversation Analysis. In *Analysing Learner Language* (pp. 197–228). Oxford University Press.

Ellis, R., Skehan, P., Li, S., Shintani, N., & Lambert, C. (2019). *Taskbased Language Teaching: Theory and Practice*. Oxford University Press. doi:10.1017/9781108643689

Estaji, M., & Saeedian, A. (2020). Developing EFL Learners' Reading Comprehension Through Computerized Dynamic Assessment. *Reading Psychology*, *41*(4), 347–368. doi:10.1080/02702711.2020.1768981

Grigorenko, E. L. (2009). Dynamic Assessment and Response to Intervention: Two Sides of One Coin. *Journal of Learning Disabilities*, *42*(2), 111–132. doi:10.1177/0022219408326207 PMID:19073895

Holec, H. (1981). *Autonomy and foreign language learning*. Pergamon.

Kamrood, A. M., Davoudi, M., Ghaniabadi, S., & Amirian, S. M. R. (2021). Diagnosing L2 learners' development through online computerized dynamic assessment. *Computer Assisted Language Learning*, *34*(7), 868–897. doi:10.1080/09588221.2019.1645181

Kavesh, A., & Rassaei, E. (2022). Mobile-Mediated Versus Face-to-Face Dynamic Assessment, EFL Learners' Writing Fluency and Strategy Awareness: A sociocultural Perspective. *Language and Sociocultural Theory*, *9*, 1. doi:10.1558/lst.20288

Lai, C. (2022). Learner Autonomy and Technology. The Routledge Handbook of Second Language Acquisition and Technology, 370–381. doi:10.4324/9781351117586-32

Lantolf, J. P. (2011). The sociocultural approach to second langugae acquisition. In D. Atkinson (Ed.), Alternative approaches to second langugae acquisition (pp. 24–47). Academic Press.

Lantolf, J. P. (2012). *Sociocultural theory: A dialectical approach to L2 research* (S. M. Gass & A. Mackey, Eds.). Routledge. doi:10.1002/9781405198431.wbeal1084

Lantolf, J. P., & Poehner, M. E. (2011). Dynamic assessment in the classroom: Vygotskian praxis for second language development. *Language Teaching Research*, *15*(1), 11–33. doi:10.1177/1362168810383328

Lantolf, J. P., & Thorne, S. L. (2006). Sociocultural Theory and the Genesis of Second Language Development. Oxford University Press. doi:10.2167/le127b.0

Lenkaitis, C. A. (2020). Technology as a mediating tool: Videoconferencing, L2 learning, and learner autonomy. *Computer Assisted Language Learning*, *33*(5–6), 483–509. doi:10.1080/09588221.2019.1572018

Li, M. (2013). Individual novices and collective experts: Collective scaffolding in wiki-based small group writing. *System*, *41*(3), 752–769. doi:10.1016/j.system.2013.07.021

Little, D. (1990). Autonomy in language learning. In I. Gathercole (Ed.), *Autonomy in language learning* (pp. 7–15). CILT.

Little, D. (1991). *Learner autonomy: Definitions, issues and problems*. Authentik.

Miao, W., & Tian, X. (2022). Persona: How Professional Women in China Negotiate Gender Performance Online. *Social Media + Society*, *8*(4), 1–11. doi:10.1177/20563051221136111

Poehner, M. E. (2007). Beyond the Test: L2 Dynamic Assessment and the Transcendence of Mediated Learning. *Modern Language Journal*, *91*(3), 323–340. doi:10.1111/j.1540-4781.2007.00583.x

Poehner, M. E. (2008). Both sides of the conversation: The interplay between mediation and learner reciprocity in dynamic assessment. In J. P. Lantolf & M. E. Poehner (Eds.), *Socio- cultural Theory and the Teaching of Second Languages* (pp. 33–57). Equinox.

Poehner, M. E. (2009). Group Dynamic Assessment: Mediation for the L2 Classroom. *TESOL Quarterly*, *43*(3), 471–491. doi:10.1002/j.1545-7249.2009.tb00245.x

Poehner, M. E., Davin, K. J., & Lantolf, J. P. (2017). Dynamic Assessment. In E. Shohamy, I. Or, & S. May (Eds.), *Language Testing and Assessment. Encyclopedia of Language and Education* (3rd ed., pp. 243–256). Springer. doi:10.1007/978-3-319-02261-1_18

Poehner, M. E., Zhang, J., & Lu, X. (2015). Computerized dynamic assessment (C-DA): Diagnosing L2 development according to learner responsiveness to mediation. *Language Testing*, *32*(3), 337–357. doi:10.1177/0265532214560390

Price, M., Handley, K., O'Donovan, B., Rust, C., & Millar, J. (2013). Assessment feedback: An Agenda for Change. In S. Merry, M. Price, D. Carless, & M. Taras (Eds.), *Reconceptualising Feedback in Higher Education: Developing Dialogue with Students* (pp. 41–53). Routledge. doi:10.4324/9780203522813

Qin, T., & Zhang, J. (2018). Computerized Dynamic Assessment and Second Language Learning: Programmed Mediation to Promote Future Development. *Journal of Cognitive Education and Psychology*, *17*(2), 198–213. doi:10.1891/1945-8959.17.2.198

Stivers, T., & Sidnell, J. (2013). Introduction. In J. Sidnell & T. Sivens (Eds.), *The Handbook of Conversation Analysis* (1st ed., pp. 1–8). Blackwell Publishing Ltd. doi:10.1002/9781118325001.ch1

Tzuriel, D., & Shamir, A. (2002). The effects of mediation in computer assisted dynamic assessment. *Journal of Computer Assisted Learning*, *18*(1), 21–32. doi:10.1046/j.0266-4909.2001.00204.x

Udeshinee, W. A. P., Knutsson, O., Barbutiu, S. M., & Jayathilake, C. (2022). Re-designing a regulatory scale for dynamic assessment in the synchronous text chat environment in collaboration with teachers. *Computer Assisted Language Learning*, 1–27. Advance online publication. doi:10.1080/09588221.2022.2092153

Vygotsky, L. S. (1998). The Problem of Age. In R. W. Rieber (Ed.), The Collected works of L.S. Vygotsky: Child Psychology (pp. 187–206). Academic Press.

Wajnryb, R. (1990). *Grammar Dictation*. Oxford University Press.

Yang, Y., & Qian, D. D. (2020). Promoting L2 English learners' reading proficiency through computerized dynamic assessment. *Computer Assisted Language Learning*, *33*(5–6), 628–652. doi:10.1080/09588221.2019.1585882

Yilmaz, Y., & Granena, G. (2010). The effects of task type in synchronous computer-mediated communication. *ReCALL*, *22*(1), 20–38. doi:10.1017/S0958344009990176

Zhang, J., & Lu, X. (2019). Measuring and supporting second language development using computerized dynamic assessment. *Language and Sociocultural Theory, 6*(1), 92–115. 10.1558/lst.31710

APPENDIX 1

Session 1

One bright sunny morning, mama makes some jam. When she puts the jam bottle up on top of the cupboard, Junior is watching and he is pretty curious. Mother gets ready to go the store and Junior asks, ''Where are you going?'' She says, ''I am going to the post office''. Junior waits until his mother is gone and checks to see what his father is doing. His father is reading a newspaper. He looks at the jar, but he is not tall enough to reach there. He takes the chair and puts it by the cupboard, and he gets a stool and he puts it on top of the chair. And he dangerously climbs on top of the chair and the stool to reach the jam. But before he can reach the jam he falls down. He starts crying; his father comes in and asks, ''What are you doing here?''

APPENDIX 2

Session 2

Early in the morning one day, seven o'clock, a little boy goes fishing and he is dreaming about the fish he is going to catch. He sits on the bank of the river, and he catches three fish. At noon, at twelve thirty he makes lunch and he cooks one fish over a fire. Later, he takes the other two fish to the fishmonger and he sells them. The fishmonger gives him two bucks for the two fish. He goes home in the afternoon and says to his dad, ''I got two fish, I sold them and I got the money''. His dad says, ''Wow, let's go to the sporting store. I can get you a volleyball or a fishing pole, what do you want?'' But the boy says, I don't wanna have a volleyball and I don't wanna have a fishing pole. I wanna have a gun.'' His dad is unhappy with this idea and says, ''A gun?''

APPENDIX 3

Session 3

Laura takes her lunch box everyday to school. Today, her father forgot to prepare a sandwich, so he gives her some money to buy an apple at the supermarket. At the supermarket, she sees some chocolate bars. She loves chocolate, so she buys one with black chocolate and peanuts instead of an apple. At the break she feels very hungry and eats the chocolate bar. It tastes so good! Then, she returns to class. They have Maths. Suddenly, her face turns red and she starts to feel very sick. Laura forgot she is allergic to peanuts! The teacher calls her father and he drives her to hospital. At the hospital, her father tells her: "an apple a day keeps the doctor away".

APPENDIX 4

Session 4

Next Sunday Mary's grandmother celebrates her birthday. Her grandmother always cooks delicious things for her but once a year Mary likes giving her a sweet surprise. She wakes up early in the morning and buys the ingredients at the supermarket. At home, first, she puts sugar and some flour in a bowl. Then, she breaks some eggs and beats them. She also adds some milk. Her brother Tom helps her to put the mixture in muffin cups and they bake them in the oven. Finally, she pours melted chocolate

and sweets on top of the cupcakes, because her granny loves them. At 6 o'clock, Mary visits her granny and gives her the cupcakes. Her granny hugs her and they eat them together!

APPENDIX 5

Session 5

A nine-year-old boy dashed through flames to pull his younger brother to safety. The little boy had been playing with a cigarette lighter while sitting on his bike. The older boy said he was standing in the kitchen when he heard his brother screaming and ran to help him. He dragged the toddler to the bathroom and turned on the water to put out the fire. Doctors praised the young hero for his quick thinking and said the boy's burns would heal with time.

APPENDIX 6

Session 6

On a cold day in winter, a snake was very hungry. He went out to find food. It was snowing. The snake was frozen on a road. At that time, a farmer passed by and he saw the snake. He picked up the snake and then put it into the farmer's clothes. The snake was warmed up and it began to move. The farmer was very happy. Suddenly, the snake bit the farmer and the farmer got hurt. He asked the snake, 'Why did you hurt me?' The snake said, 'Well, you saved me, but now you have caught me, too.' The farmer was very angry and said, 'I saved you, but you bit me.' Then the snake said nothing and left the farmer.

APPENDIX 7

Session 7

One day a tiger was hungry. He went out for food. On the way he saw a ball. A rabbit was pushing that ball. After a while, the ball hit a stone and stopped. The rabbit tried to pull the ball, but the ball did not move. At this time, the tiger came to the rabbit and said, 'Can I help you?' 'Yes, please!' the rabbit was very happy. Then the rabbit pulled the ball, and the tiger pulled the rabbit. At last, they pulled the ball away from the stone. But the tiger was still holding the rabbit. The tiger said, 'I am hungry. Can you help me?' The rabbit got scared and shouted. Suddenly there a sound was heard. A gun has killed the tiger. The rabbit got saved.

APPENDIX 8

Session 8

Kiki was raised in a small house in the countryside. One day he was playing when suddenly there was a big earthquake. He was knocked down by the falling bricks. Then the walls fell down. He was trapped in the house. It was very dark. Kiki was badly hurt and could not move. Later Kiki's mom came back home. She saw the house was destroyed. She thought her boy was buried in the house. She shouted out to him. He could not hear her because he was covered with bricks.

Some dogs were brought to search for him. Kiki was found. The bricks were removed. Kiki was pulled out of the wreckage of the house. He was carried to the local hospital. He was put in an emergency room for treatment. He was given special food to help him recover. He was allowed to leave the hospital after one month.

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