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Diagnosing L2 Receptive Vocabulary Development Using Dynamic Assessment: A Microgenetic Study

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Abstract

The present study is an attempt to shed light on the effect of Dynamic Assessment (DA) on diagnosing and developing the receptive vocabulary abilities of upper-intermediate learners learning English as a foreign language. Fifty L2 leaners participated in the First Certificate in English test and completed Vocabulary Knowledge Scale. Out of 50 students, ten learners who were identified as being homogenous and were not familiar with the new vocabularies volunteered to participate in individualized tutoring sessions. Reading texts were used to make learners familiar with the target words and cloze passages were administered to assess learners' receptive vocabulary. Mediation was provided using the interactionist approach to DA and learners' responsiveness to mediation were studied in a microgenetic approach. The qualitative data were then coded in terms of task completion along with errors and struggles and transformed into quantitative data for analysis. The actual, mediated and transfer scores were reported to analyze learners' Zone of Actual Development (ZAD), and the degree of the internalization of mediation. Findings of the study revealed that to have a complete picture of learners' abilities, actual scores are not self-sufficient. Mediated scores are vital to diagnose learners' areas of difficulties and to promote learners' receptive vocabulary knowledge. The information from transfer scores also uncovers evidence of learning and data from Learning Potential Score (LPS) predict how learners probably respond to future instruction. Findings of the study indicate that DA is promising in presenting a fine-grained diagnosis of learners' receptive vocabulary development while also suggesting information related to future teaching and learning.

Keywords: dynamic assessment, mediation, ZPD, transfer, vocabulary development

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The last decade has witnessed much concern and debate on the diagnostic assessment of language learners. Alderson, Brunfaut, and Harding (2014) argued that the existing testing procedures merely iron out learners' performances and are of few pedagogical applications. According to Alderson et al. (2014), the present era asks for more detailed evidence on an individual's performance in order to inform high as well as low stakeholders in language learning and assessment. That is to say "traditional, reliability-obsessed, deficiency-oriented approach to diagnosis needs to be broadened to an examination of what learners are able to accomplish in diverse contexts (Kunnan & Jang, 2009, p. 622). Diagnostic feedback is at the heart of diagnostic assessment. Indeed, diagnostic testing pursues how an individual performs the test/task and provides diagnostic feedback on the individual's underlying processes. The resultant meaningful feedbacks are helpful in integrating curriculum with teaching and assessment to enhance learners' abilities (Poehner, Zhang, & Lu, 2015).

One manifestation of diagnostic assessment can be found in Dynamic Assessment (DA) of learners' development (Poehner, 2005; Ableeva, 2010; Poehner et al., 2015). DA is inspired by Vygotsky's theorization of Socio-Cultural Theory (SCT), particularly his thinking on the Zone of Proximal Development (ZPD). ZPD assumes learners' independency and externally mediated functioning. This informed Luria (1961), Vygotsky's colleague, to differentiate static testing from dynamic assessment. This trend was further influenced by Structural Cognitive Modifiability theory proposed by Reuven Feuerstein. According to Peohner et al. (2015), in DA

> assessor, or mediator, provides intentional support when difficulties arise during the assessment procedure and carefully documents learner responsiveness. Following Vygotsky, learner independent performance is interpreted as an indication of abilities that have fully formed, while abilities that have begun to emerge but have not yet completed their development are inferred according to learner responsiveness to support offered by the mediator. (p. 3)

To Vygotsky, learner's responsiveness to the mediation suggests that her/his abilities are in the process of improvement. This shows her/his

development in the course of her/his ZPD. In line with Alderson et al.'s (2014) emphasis on diagnostic assessment, this study sought to diagnose the receptive vocabulary development of language learners grounded in DA.

Literature Review

ZPD is the cornerstone of Vygotsky's SCT. The ZPD was introduced by Vygotsky as a diagnostic principle which allows researchers and instructors to have a fuller picture of learners' developmental trajectory as well as of the kinds of problems that hinder their cognitive growth. ZPD differentiates a learner unmediated and mediated performances. As Poehner and Lantolf (2013) stated, the diagnosis made in DA makes it different from other types of assessment; "collaborative functioning with others is given equal, if not greater, attention" (p. 324). Based on Vygotsky's (1987) discussion of the ZPD, learner's responsiveness to the mediation signifies the development of his/her abilities presenting the processes underlying his/her performances. Another important concept that Vygotsky differentiates from ZPD is Zone of Actual Development (ZAD). To Vygotsky, ZAD reveals an individual's independent performance while ZPD shows what the individual is capable to do under the guidance of a mediator/assessor. ZPD has diagnostic principles to indicate the individual's potential level of development besides the kinds of difficulties that hinder his/her cognitive growth. Therefore, Vygotsky discusses, instruction and assessment should incorporate ZPD as well as ZAD in order to give a complete insight of the individual's development.

In the literature of DA, two models of mediation have been proposed, interventionist and interactionist approaches to DA. The interventionist approach to DA is informed by Vygotsky's quantitative interpretation of the ZPD as a 'difference score' (Poehner & Lantolf, 2005). The interventionist encompasses a formal and standardized approach in mediating learners in either forms of pre-test/treatment/post-test, namely sandwich format, or a set of pre-fabricated prompts presented item-by-item, namely cake format. The famous proponent of interventionist approach is Milton Budoff. Budoff (1987) was more concerned with designing a means to quantify and classify learners more precisely. On the other hand, interactionist approach to DA is

informed by Vygotsky's qualitative interpretation of the ZPD. The interactionist encompasses an open-ended qualitative collaboration between mediator and learner. Leading questions and prompts are not planned ahead but they arise from mediated dialogue. The famous proponent of interactionist approach is Reuven Feuerstein. Feuerstein in his theory of Structural Cognitive Modifiability proposes that

> human beings are 'open' rather than 'closed' systems, meaning that cognitive abilities are not fixed traits determined by our genetic endowments in the way height and eye colour are, but rather they can be developed in a variety of ways, depending on the presence – and the quality – of appropriate forms of interaction and instruction (Feuerstein, Rand, & Rynders, 1988, p. 5).

To Vygotsky, an individual's development is both evolutionary and revolutionary which encompasses progression as well as regression processes. This development is always an advanced movement, although some regression might be seen in the course of learning. Vygotsky believes that this development can best be captured by the help of genetic method i.e. exploring the changes over a span of time. Vygotsky differentiates four types of genetic study: "phylogenetic (the development over the course of human evolution), sociocultural (the development of human cultures), ontogenetic (the development of an individual over a relatively long span of time, e.g. 10 years) and microgenetic (the development of a specific process of an individual over a short period of time, e.g. 2-3- months)" (cited in Ableeva, 2010, p. 7).

While microgenesis has primarily been implemented in the process of oral (Poehner, 2005), listening (Ableeva, 2010; Poehner & Lantolf, 2013; Poehner et al., 2015) and reading development (Poehner et al., 2015), this article pursued the effect of mediation on learners' receptive vocabulary knowledge. Vocabularies are the essential part of a successful communication. By the help of words, individuals can express themselves, exchange ideas and show feelings and attitudes. According to Schmitt (2000), vocabularies are divided into productive (active) and receptive (passive) categories. Productive vocabularies are the type of words which

learners learn through day to day communication and apply them daily in their speaking and writing. By contrast, receptive vocabularies are vital for general comprehension when arising in context. They are not utilized on a daily basis (Schmitt, 2000). Vocabulary instruction is often a neglected area. Learners always face long lists of vocabularies with or without translations that they have to memorize. According to Meara (1980), this teaching and learning mode "completely ignore[s] the complex patterns of meaning relationships that characterize a proper, fully formed lexicon" (p. 225). In this respect, the study incorporated a more fine-grained and individually negotiated modes of mediation to indicate learners' mediated and unmediated performances, report their learning potential and uncover evidence of their vocabulary development.

The body of literature, to the best of our knowledge, has not reported many DA studies of vocabulary development. Generally, three classes of studies can be found. The first category of studies worked with children with learning difficulties (Alony & Kozulin, 2007; Kapantzoglou, Restrepo, & Thompsona, 2011). The second and third categories reported results from children (Burton & Watkins, 2007) and EFL/ESL learners (Shabani, 2014; Taghizadeh & Bahrami, 2014; Woltera & Pikea, 2015), respectively. The common feature of these studies is the implementation of interventionist approach to DA (e.g. Taghizadeh & Bahrami, 2014 for cake DA format and Kapantzoglou et al., 2011 for sandwich DA format) except for Alony and Kozulin, (2007) who followed the principles of mediated learning experience (Feuerstein, Rand, & Hoffman, 1979) actively supporting the child's cognitive modifiability. For example, Taghizadeh and Bahrami (2014) combined Budoff's (1987) Test-Train-Test model, Campione and Brown's (1987) graduated prompting assessment model and Sternberg and Grigorenko's (2001) cake format to explore the effect of DA on EFL learners' lexical inferencing ability. Learners were asked to guess the meaning of unknown words and the instructor mediated them moving from most implicit to the most explicit prompts based on strategies of lexical inferencing. On the other hand, Kapantzoglou et al. (2011) adopted a pretest–teach–posttest design to teach three nonwords with three unfamiliar items in single session of 30–40 minutes. Target words were taught using a

scripted structured play activity and learners were mediated through learning strategies. The studies argued that DA is a promising method for mediating L2 learners' vocabulary growth.

Another feature of these studies is that vocabularies were worked on either in decontextualized form such as multiple choice question (e.g. Taghizadeh & Bahrami, 2014) or in the form of cards or toys (e.g. Burton & Watkins, 2007) except for Shabani (2014) who presented reading passages in which the target words were highlighted and students were required to read and learn them. For example, Burton and Watkins (2007) examined expressive word mapping of children. Toys corresponding to the new words were given to the children for the dynamic part of the assessment. Children's performances were compared on the Peabody Picture Vocabulary Test-Third Edition and on the dynamic assessment of word mapping. The results of the study revealed that dynamic assessment techniques in conjunction with traditional vocabulary tests produce potential data to estimate children's word-learning ability. In another study, Shabani (2014) followed a pretest-treatment-posttest-TR (transcendence) design accompanied with a number of electronically enhanced reading texts with hyperlinked glosses to instruct vocabularies (during the treatment) and multiple-choice vocabulary tests to assess learners' performances (during pre- and post-tests and TR). 60 intermediate EFL learners were assigned to two treatment groups i.e. an implicit group (N = 20) and an explicit group (N = 20), and a control group (N = 20). The implicit group received the implicit treatment, the explicit group received the explicit treatment and the control group received no treatment. The results of paired-samples t-test and ANOVA revealed that the treatment groups scored higher while the explicit group outperformed the implicit one. Moreover, results from TR session provided evidence for learners' growing agency and independent functioning in innovative contexts.

To be precise, Alony and Kozulin, (2007) sought the dynamic aspects of receptive language development of young children with Down syndrome (DS). Peabody Picture Vocabulary Test (PPVT-R) was implemented among thirty children in the form of dialogic interaction to modify their cognitive abilities. According to Alon and Kozulin, the mediation was provided in

order to help the child to deal with his/her difficulties in the input and output levels, while carefully attending to his/her capacity for explanation. Mediation was provided through teacher-learner interaction. Findings of the study revealed that "even a minimal mediation in the form of 'focusing' improves the receptive language performance of children with DS" (p. 323). In this way, the present article informed by diagnostic assessment principles, Vygotsky's SCT, and DA pursued the effect of an interactionist approach to DA on L2 learners' learning potential. The following question was addressed

To what extent can DA diagnose and promote the development of receptive vocabulary of L2 learners?

Method

Participants

The sample of the study was selected out of 50 learners learning English as a foreign language at the Sokhanvar Language Institute in Isfahan, Iran. Prior to the study, the researchers administered the First Certificate in English (FCE) to check learners' proficiency level. Then, the researchers administered a Vocabulary Knowledge Scale to differentiate students who were familiar with the new vocabularies from those who did not know the new words. Thirty students were identified as being homogenous and were not familiar with the new vocabularies. Then, one of the researchers participated in one of their regular classes in the institute and invited learners to participate in a vocabulary learning class which would be held one session every week. The purpose of the study was briefly explained and it was stated that the study aimed to investigate a new approach to assessing and improving learners' vocabulary knowledge. It was also explained that the classes would be held in the form of individualized tutoring sessions. Out of thirty students, ten students who could take the class based on the schedule of the study and institution volunteered to participate. In this way, ten upper-intermediate female (N = 6) and male (N = 4) L2 learners of English language participated in the study. The learners were between 15 and 18 years of age, with the mean of 17.

Instruments

Four sets of instruments were applied to collect data. The first instrument the First Certificate in English (FCE) was administered before recruiting participants. The test is developed by Cambridge English Language Assessment and assesses the four language skills i.e. reading, listening, writing and speaking at intermediate and upper-intermediate levels. The first part includes 56 questions for reading and writing, the second part contains 25 questions for listening, and the last part assesses learners' speaking ability. Regarding the validity and reliably of FCE, Cambridge English Language Assessment Center (2013) reported a high validity and reliabilities of 0.8 and above for the test. In the next phase, 29 multiple-choice cloze tests were randomly selected from BA University Entrance Exam (Konkour) held every year by the Ministry of Science, Research, and Technology in Iran. Out of various types of vocabulary tests, a cloze passage was selected since it contextualizes vocabulary learning for the subjects and mediates them through the related text. Of 29 cloze passages, 23 passages were short; the other six passages were longer and more difficult compared to the 23 passages. Each cloze passage includes four vocabulary questions for each of which four options (one correct option and three distractors) were presented. Then, a list of 116 new words was prepared from cloze passages; the target vocabularies tested in the cloze passages were extracted. Following that, the Vocabulary Knowledge Scale (VKS) designed by Wesche and Paribakht (1996) was used. VKS is a 5-point self-report scale that permits learners to indicate how well they know items of vocabulary. The learners were required to select 1 (*I do not remember having seen this word before*) indicating a total unfamiliarity to 5 (*I can use this word in a sentence as* ….) indicating the ability to use the vocabulary with grammatical and semantic accuracy in a sentence (see Table 1). According to Wesche and Paribakht (1996), VKS is a valid scale with high reliability (0.8).

Table 1

Vocabulary Knowledge Scale (VKS) designed by Wesche and Paribakht (1996)

Vocabulary item	I do not remember having seen this word before. (put a tick (√)in the box)	I have seen this word before, but I do not know what it means.	I have seen this word before, and I think it means _____. (Synonym or antonym)	I know this word. It means _____. (Synonym or antonym)	I can use this word in a sentence: _____.
	1	2	3	4	5

The purpose of using VKS was threefold. First, it aimed to identify a set of unknown words to be worked on during the study. In this regard, only the words that the learners ticked 1 and 2 in the VKS were chosen. Second, the vocabulary items which were explored through VKS were chosen from 29 cloze passages. Thus, the cloze passages which learners knew their vocabulary items were omitted. Third, it aimed to differentiate learners who knew the new words from those who did not know the new vocabularies. In this way, 84 vocabularies which learners were not familiar with and 21 cloze passages whose vocabularies learners did not know were identified. Out of 21 cloze passages, 18 passages were short; these passages were worked during pre-enrichment/enrichment/post-enrichment phases. The other three passages were longer and more difficult compared to the 18 passages; these cloze passages were implemented during the transfer session. All cloze passages (n=21) were then piloted with 29 learners from the same institute and proficiency level. The Cronach α was calculated to check the reliability of the cloze passages (0.74).

Indicating the proficiency level and homogeneity of learners and making sure that the learners were not familiar with the new vocabularies, the researchers asked a university lecturer who was specialized in teaching TOEFL to write ten writings (300 words per writing) using the target vocabularies. That is if ten vocabularies were aimed to be worked on in one session, all ten vocabularies were found in the writing implemented in that session. The writings were descriptive in nature and mostly about

educational issues e.g. education in foreign universities, self-study vs. group study and the like. These writings then were applied as reading texts to implicitly familiarize learners with the target vocabularies. It should be noted that the purpose of using the reading texts was to make learners familiar with the target words. Learners would read the text and may use the target vocabularies when the instructor asked a question about the reading text; however, they did not have a full conceptual understanding of these words to use them individually. In this sense, the cloze passage was remedial in its attempt to build upon the learners' incidental grasp of the new vocabularies to form a full comprehension. Therefore, DA support was provided only in time of cloze passages.

Procedure

Microgenetic method introduced in SCT was selected to implement the study. As Vygotsky (1987) explains, microgenesis permits the tracking of learners' development over a particular span of time. Ableeva (2010) pointed out that

> The microgenetic method primarily concerns the reorganization and development of mediation over a relatively short span of time. This method also adheres to the principles of active formation and recreation of the very processes of development and seeks to find ways of influencing developmental processes. (p. 163)

In this way, the present study adopted microgenetic method in order to observe learners' skill acquisition as well as track their vocabulary development over a three month period of time. In accordance with a SCT-based DA framework and in order to have a comprehensive view of ZPD, qualitative approach was selected to collect data. According to Vygotsky (1998, p. 204), "we must not measure the child, we must interpret the child". The qualitative data were then coded and transformed into quantitative data for analysis.

In designing the procedure, the study implemented the methodological design followed by Poehner (2005). Poehner applied interactionist approach to DA to collect data on learners' development. This method allows a

"flexible interaction between the mediator and the learner as the two cooperatively perform the assessment task" (Poehner, 2005, p. 155). Moreover, the interactionist approach to DA provides greater opportunities to support microgenesis since mediation can be more accurately adjusted to an individual's (or a group's) needs. Thus, the mediator and learners cooperatively worked on vocabulary items and the mediator provided them with hints, prompts and questions whenever she felt it necessary or upon learners' request. Based on the specific context of mediator-learner interactions, the mediator provided mediation using Poehner's (2005) Mediation Typology. The typology includes 15 types of mediator's assistance beginning with relatively implicit forms of mediation to very explicit intervention (see Figure 1).

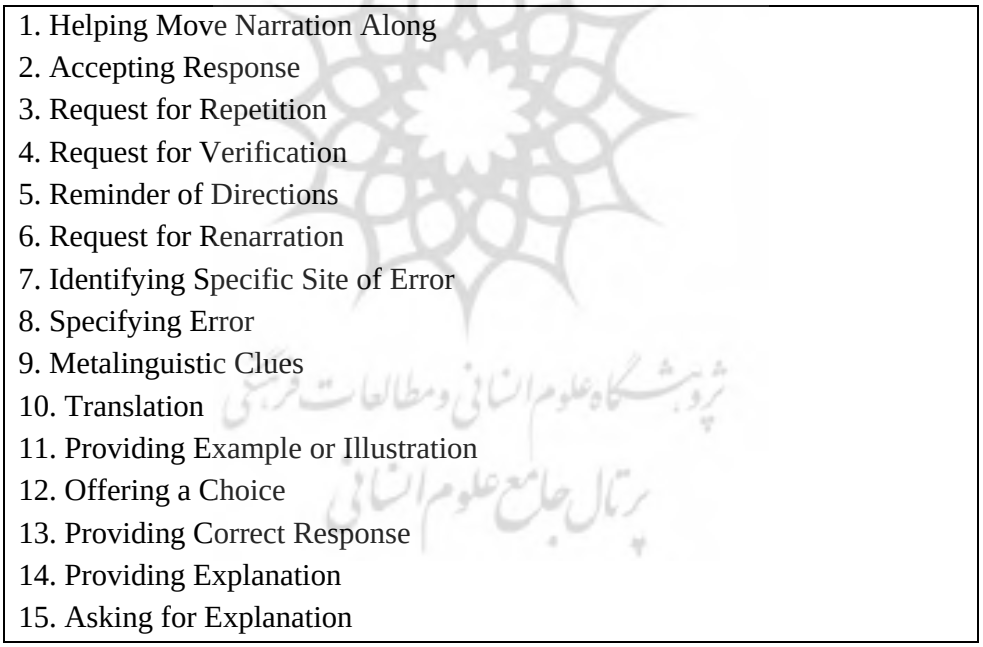

Figure 1. Mediation typology (Poehner, 2005, p. 160)

When there were errors or struggles for completing the task, the mediator provided hints for each individual item. While the precise content of the moves differed across items, they each followed the same form of moving from most implicit to most explicit across all individuals. It should

be noted that the mediation provided did not necessarily follow the hierarchical order of strategies listed here (though the mediator intended to move from less explicit strategies to more explicit ones); rather, the mediator used them in accordance with the specific context of mediator-learner interactions and the content of each item.

The design of the study included four parts: pre-enrichment/enrichment/post-enrichment and transfer assessment session (see Table 2). The pre-enrichment included NDA1 and DA1. First, in each session i.e. NDA or DA, a reading passage containing the new vocabularies was worked: 1) the instructor explained the main idea and content of the reading aiming to use the target vocabularies; 2) the learners silently read the text; 3) the instructor asked for summary of the paragraphs or asked questions trying to focus learners' attention on the target vocabularies. The meaning of the new and target vocabularies were provided through explanations or examples. Then, four cloze passages were administered once in non-dynamic method (NDA1) (two cloze passages) and the other time in dynamic assessment (two cloze passages) (DA1). It should be mentioned that DA support was provided only in time of cloze passages in DA1 session. These beforehand sessions helped to create a more fine-grained diagnosis of learner's abilities and their problem areas respecting receptive vocabulary development.

Then, the enrichment program started; the enrichment program was influenced by Feuerstein et al.'s (1988) Instrumental Enrichment and concentrated on learners' problem areas detected and diagnosed in NDA1 and DA1 sessions. Regarding the contribution of NDA and DA to the design of enrichment phase, it is important to note that although NDA detected problems in learners' performances, it was difficult to detect the full degree and accurate source of problems, "let alone revealing potential ways of helping learners overcome them" (Poehner, 2005, p. 137). On the other hand, DA had significant contribution to the design of enrichment program. As Poehner (ibid) explains

> First, cooperative dialoguing between the mediator and the learners during DA provided insights into the underlying causes of poor performance as well as the extent of the problems. Moreover,

> mediator-learner interactions also illuminated how close learners were to independently perform and the kinds of mediation they required to improve their control. (p. 137)

Data from DA1 revealed that learners had problems in understanding the text e.g. capturing the meaning of the sentences/clauses, or dealing with grammatical structures e.g. having difficulty with noun/adjective clauses when their wh- was omitted. DA1 data pinpointed that the learners could be helped to find the correct vocabulary in the cloze passages, but various kinds of mediation were needed. First, learners read the text similar to pre-enrichment phase to be familiarized with the new vocabularies, then the cloze passages along with mediation was provided. The learners were assisted regarding particular grammatical structures including relative clauses, conjunctions, and references. Lexical inferencing adopted from Bengeleil and Paribakht (2004) and the attention to phrases instead of individual words in comprehending the text were among other mediations provided to the learners. It should be mentioned that the mediation was provided only when learners worked on cloze passages. Thus, the enrichment program continued the work begun during DA1 since the two phases focused on learners' ZPD aiming to develop their receptive vocabulary. Each session included one reading text along with two cloze passages.

After the enrichment phase, the post-enrichment phase was held. Similar to pre-enrichment phase, two reading texts were studied in NDA2 and DA2 sessions (one text per session). Then, four cloze passages were administered once in non-dynamic model (NDA2) (two cloze passage) and the other time in dynamic assessment (two cloze passages) (DA2). At last, two weeks later the Transfer session with one reading text and three cloze passages was held. The purpose of holding the Transfer session was to indicate how well learners internalized mediation and to trace their development of vocabulary abilities creating a potential for microgenesis. First, the reading was worked with learners in the same manner to pre- and post-enrichment, then three cloze passages were administered in the DA form.

Table 2

The Design of the Study: Assessment and Enrichment Sessions

			Task description	*Instruments*	*Mediation offered*
Pre-enrichment	Session/week one	NDA1	Read the text and provide a summary Read the cloze passages and find the answer	One reading text and Two cloze passages	None
	Session/week two	DA1	Read the text and provide a summary Read the cloze passages and find the answer with the mediator's help	One reading text and two cloze passages	flexible interaction between the mediator and the learner
Enrichment	Sessions three to seven (one session per week)	Enrichment phase	Read the text and provide a summary Read the cloze passages and find the answer with the mediator's help	Five reading texts and ten cloze passages	flexible interaction between the mediator and the learner
Post-enrichment	Session/week eight	NDA2	Read the text and provide a summary Read the cloze passages and find the answer	One reading text and two cloze passages	None
	Session/week nine	DA2	Read the text and provide a summary Read the cloze passages and find the answer with the mediator's help	One reading text and two cloze passages	flexible interaction between the mediator and the learner
Transfer assessment	Session/week ten	T	Read the text and provide a summary Read the cloze passages and find the answer with the mediator's help	One reading text and three cloze passages	flexible interaction between the mediator and the learner

Data Analysis

Three types of performances were studied in this study: independent (unmediated) performance, dependent (mediated) performance and learners' degree of internalization. The data from enrichment phase was not reported since the main purpose in this phase was to diagnose and assist learners to deal with the cause of vocabulary difficulties. Thus, results from NDA, DA and T sessions were reported because these sessions demonstrate evidence of receptive vocabulary development. The assessment sessions i.e. NDA1 and 2, DA1 and 2, and T were tape recorded and transcribed. The data were coded to analyze learners' receptive vocabulary development in terms of task completion along with errors and struggles. In non-dynamic sessions i.e. NDA1 and 2, any correct response for each item scored 4 and incorrect one scored 0. In dynamic and transfer sessions i.e. DA1, 2, and T, the main purpose was providing mediation in order to develop learners' abilities. If learners were able to respond correctly, they scored 4. But if learners did not answer correctly, a series of hints were provided until learners answered correctly or the instructor provided the correct answer:

a) if the learner's first response to that item was correct, a score of 4 was granted for that item.
b) if the learner's second attempt at the same item produced a correct response, a score of 3 was granted.
c) if the learner's third attempt at the same item produced a correct response, a score of 2 was granted.
d) if the learner's fourth attempt at the same item produced a correct response, a score of 1 was granted.
e) if the instructor provided the correct answer, a score of 0 was granted.

Then, for any given item the learner's mediated score may be any number ranging from 0 to 4 based on whether and how much mediation would be provided. The same scoring procedure was applied for each individual item. Following that, comparisons were made:

- between NDA1 and NDA2 to determine any changes in learners' ZAD
- between DA1 and DA2 to determine any changes in learners' ZPD

- between DA2 and Transfer session to determine how well learners internalized mediation and to what extent they were able to keep their level of functioning while mediation provided to them
- Learning Potential Score (LPS) proposed by Kozulin and Garb (2002) was further calculated to check the degree of progress individual learners made under conditions of mediation. As Poehner et al. (2015) explain, "a simple gain score, such as Budoff had proposed, does not adequately capture how learner scores changed, relative to the maximum possible score on the test, when mediation was introduced to the procedure" (p. 10). The formula to calculate LPS is as follows:

LPS= (S post - S Pre)/Max S + S post/Max S = (2S post) - S pre/Max S

Results and Discussion

Table 3 demonstrates the descriptive statistics of learners' independent and mediated performances. The learners' performances before and after the enrichment pinpoint interesting findings respecting receptive vocabulary development through cooperative interaction with the mediator. Comparisons of means reveal that learners had better performances not only in DA2 and T but in NDA2. Based on the differences in the mean scores of NDA1 (M = 8.80, SD = 5.26) and NDA2 (M = 14.40, SD = 5.05), it can be noted that learners had improvement over time. The results signify development in learners' ZAD. This could be due to the mediation provided over the enrichment phase.

Table 3 also shows the descriptive statistics of learners' performances in the mediation and transfer sessions. To gain insights into learners' development, ZPD, beyond their actual production, ZAD, comparisons of their performances at different points in time are required. That is the results of DA1, 2 and T sessions. The mean score of learners in DA2 (M = 21.10, SD = 3.17) after the enrichment phase reveals a marked improvement in learners' vocabulary as compared with their DA1 (M = 11.40, SD = 2.06) before the enrichment phase. Importantly, the mean score of learners is higher in T session (M = 33.10, SD = 2.80) compared to NDA2 and DA2 administered after the enrichment phase. This supports the positive effect of

mediation on the development of learners' receptive vocabulary and is evidence of learners' internalization of mediation. It denotes that learners required fewer mediations in T session and learning thus has happened. The mean score of gain scores between NDA1 and 2 (M = 5.1, SD = 2.07), DA1 and 2 (M = 10.80, SD = 3.70), and DA2 and T (M = 12.00, SD = 3.97) was also presented in Table 4. The gain scores indicate the change between the independent and mediated performances, manifesting improvement in learners' receptive vocabulary knowledge during mediation. Likewise, Poehner and Lantolf (2013) and Poehner et al. (2015) reported improvement under mediation based on learners' gain scores. The gain scores indicated the change between the actual and mediated scores of learners' listening and reading comprehension ability.

Table 3

Descriptive Statistics of Non-Dynamic and Dynamic Sessions

	Pre-enrichment		Post-enrichment		Transfer
	NDA1	DA1	NDA2	DA2	T
Mean	8.80	11.40	14.40	21.10	33.10
SD	5.26	2.06	5.05	3.17	2.80

Table 4

Descriptive Statistics of Gain Scores in Non-Dynamic and Dynamic Sessions

	Mean	SD
Gain score NDA	5.10	2.07
Gain score DA	10.80	3.70
Gain score T	12.00	3.97

Paired-samples t-tests were also run to check the significance of the changes exhibited in the learners' mean scores in independent and mediated performances. According to Table 5, learners revealed significant differences in the actual scores (t (9) = -8.57, p = .00), mediated scores (t (9) = -10.28, p = .00) and transfer scores (t (9) = -9.55, p = .00). Furthermore, to reduce the likelihood of a Type I error i.e. spuriously significant difference, the Bonferroni adjustment was conducted. The desired alpha-level (0.05) was divided by the number of comparisons made (3) and the least significant differences (LSD) p-value required for significance would be .05/3 = .0167.

Since the p-value levels of the three comparisons are lower than the adjusted alpha-level (p= .000 ≤ .0167), it can be concluded that the pairs of NDA1 and 2, DA1 and 2, and DA2 and T tests show significant differences. The effect size of the impact is also at very high level for the independent (Cohen's d = 1.08), mediated (Cohen's d = 3.62) and transfer (Cohen's d = 4.01) performances. This pinpoints a dramatic improvement as a result of mediation on the learner's scores. Results from Ableeva's (2010) study similarly revealed that mediation and enrichment significantly promoted learners' ability to comprehend authentic aural texts. According to Ableeva (ibid), mediation gives insight into the learners' specific problem areas and thus helps to overcome the problems. Through DA, the mediator is able to identify the abilities that have already developed, those that are developing and those that are yet to develop. When these are discovered, it is then possible to effectively promote learners' abilities. Poehner et al. (2015) also discussed that being sensitive to ZPD, DA procedure enables the mediator to discover how much mediation a learner needs to complete a task and thus help her/him in a maximally effective way.

Table 5

The Results of Paired-samples T-tests and Effect Size

	NDA1-NDA2	DA1-DA2	DA2-T
Paired-samples t test	t = -8.57 *p* = 0.000 d = 1.08	t = -10.28 *p* = 0.000 d = 3.62	t = -9.55 *p* = 0.000 d = 4.01

Here, some mediations provided for the dynamic sessions are transcribed. The first extract is for the mediator-learner interaction when the learner (L) was unable to provide the correct response [the word in the bracket]. The extract below is taken from Maryam's DA1 session. First, the mediator (M) invited the learner to re-read the related part so that she reconsidered her selection (turn 3). The mediator did not aim to indicate the nature of the problem but prompted the learner to search for any potential mistakes that needed her attention. In her fist attempt (turn 4), Maryam asked the meaning of the word *concealed* since she thought to answer the item she must know the meaning of this word. The mediator provided an explanation for the word but the learner could not answer it (turns 5 and 6).

The instructor waited for her to continue and when Maryam did not she interrupted to ask her a question in order to give clues concerning the part that she should pay attention to (turn 7). In the following lines (9-11), the mediator tried to encourage Maryam to focus on the relation between the words i.e. bone, tooth in the sentence and resorted to *Guessing Strategy*. In this technique, the mediator reread/ rephrase the relevant segment of the passage or repeat learner's answer but left it to the learner to find the correct response. These prompts in some cases helped the mediator find the underlying source of the problem.

1.M: The correct response for the third blank is --

2.L7: It is d, *to take a picture of a bone, tooth, or [unit] concealed from direct sight*.

3.M: Maryam, look at the sentence once more.

4.L7: (Maryam reads the sentence quietly) concealed … means?

5.M: It means you cannot see or find it, it is hidden.

6.L7: Mhmm …

7.M: Ok, the text says that we use x ray to take pictures of what?

8.L7: bone, tooth or …

9.M: Or?

10.L7: (she thinks) things we cannot see or find.

11.M: Good. So the bone, tooth or things all are?

12.L7: (she looks at the text once more) the answer is object?

13.M: Yes, excellent.

In the next extract, taken from Leila's enrichment session, the mediator prompted the learner to pay attention to the key words and the reference of the words. The instructor first resorted to *Asking the words strategy* and tried to help Leila by asking the meaning of *sell back* (turn 4), and when she had difficulty understanding the word (turn 5) the mediator provided an explanation and example for the word (turn 6). The instructor then questioned the reference of the pronoun *it* (turn 8), provided an explanation about the sentence (turn 10), and posed a question (turn 13) to show the relation between the word in the blank and the key phrase *sell it back* in the second part of the sentence. In the fourteenth turn, the learner first selected a wrong word and then immediately provided the correct response. But to check that she was not guessing it, the mediator asked the reason for such

choices (turn 15). And in the following turn (17), the instructor used *Asking the words strategy* again and the meaning provided by the learner ensured her that the learner had understood the part.

1.M: Leila, look at the second blank.

2.L5: (Leila reads the related part quietly) *Situationist International states that free time is rarely free; economic and social forces [……] free time from the individual and sell it back to them as a product known as "leisure"*. The answer is decrease?

3.M: No, it is not correct.

4.M: Leila, tell me what does sell back mean?

5.L5: It means (she thinks) you buy something and then bring it back?

6.M: Actually, it means to sell something you previously bought. For example, you buy a book from a bookstore, and after one week or so you sell that book to the same bookstore. Do you understand?

7.L5: Yes.

8.M: Now, in this phrase *sell it back*, what does *it* refer to?

9.L5: (she reads the text) it refers to free time?

10.M: Exactly. Now, rephrase the sentence.

11.L5: Economic and social forces … free time from the individual and sell the free time again to them as a product known as "leisure".

12.L5: --- (she thinks)

13.M: Ok. Leila, when economic and social forces can sell free time back to us?

14.L5: Mhm, the answer is d. (she thinks) no, no, no. it is steal.

15.M: Why you didn't choose d?

16.L5: Because economic and social forces steal free time, they couldn't distract free time and sell it back.

17.M: What does distract mean Leila?

18.L5: Monharef kardan? (she speaks in her L1)

19.M: Yes. You are right. Now, look at here – *Situationist International states that free time is rarely free; economic and social forces [steal] free time from the individual and sell it back to them as a product known as "leisure"*.

20.M: So, you are right. It is a.

The extract below, which occurred during DA2, captured mediator-learner (Pedram) interactions involving providing metalinguistic clues and example/illustration. At first, the learner expressed his doubt about the answer. In the following turns (6-8), the mediator prompted Pedram to pay attention to the text with rising intonation on the part that helped him to find the answer. Then, the instructor provided an explanation about the adjective clause (turn 9) and rephrased the sentence for the learner (turn 11). Upon Pedram's silence, the mediator interrupted again and provided explanation and example for the word *angular* which was higher than his proficiency level (turn 13).

1.M: Pedram, let me see what your response is.

2.L2: Here you are. But I'm not sure about it.

3.M: Ok. Let's check it. (she reads the text) *it was a painting of human figures represented by angular and distorted [……] .*

4.M: What is your idea Pedram?

5.L2: Phases?

6.M: No, that's not the correct answer. Look at the sentence, what does it say?

7.L2: It is about one of Pablo Picasso's paintings.

8.M: According to this sentence: *In 1907, Picasso painted a picture called Les Demoiselles D'Avignon, which shocked many people. It was a painting of* ***human figures*** *represented by angular and distorted ……... .*

9.M: This part *represented by angular and distorted* is an adjective clause. The clause should start with "which", however, the word "which" has been omitted here.

10.L2: So, this clause describes human figure?

11.M: Yes. In the painting we can find human figures which are drawn in angular an distorted … ?

12.L2: -- (he thinks)

13.M: Look at the word angular. Angular means having angles or sharp corners, for example a square is an angular object (she draws a square on the board and shows the angles).

14.L2: khob in yani Picasso ye naghashi az ensanha keshide ke dar tarh hâ (he speaks in his L1)

15.L2: ahan, javabesh mishe shapes.
16.M: Yes, you are right.

Concerning the learners' actual and mediated performances, Poehner et al. (2015) discuss

> DA is not to improve student test scores but to attempt a diagnosis of actual and potential, or proximal, development. While the actual score indicates learner independent performance, it tells us nothing about how much mediation a learner needed as he or she worked through items targeting specific language constructs. Following Vygotsky's position that for diagnosis to be maximally informative for subsequent instruction it must take account of the ZPD, the mediated score signals learner responsiveness to mediation during the test (p. 11).

Thus, if a learner needs fewer interventions or less explicit mediation in DA2 as compared with DA1, it can be noted that the learner had development, even if s/he does not show full control over the relevant features in independent performance. To diagnose and give insights into learners' independent and mediated performances, learner responsiveness to mediation should be calculated i.e. LPS. According to Kozulin and Garb (2002), LPS score is divided into three levels:

- LPS≥1.0 as high
- 1.0≥LPS≥0.71 as medium
- LPS≤0.71 as low

Kozulin and Garb (ibid) argued that learners with different LPS need different levels of instructional help in order to promote their abilities. Table 6 demonstrates each individual's gain scores of actual and mediated performances and LPS. As Table 6 shows, the LPS ranges from 0.18 to 0.81. It is noticeable that learners may have similar independent performance, but different mediated score and accordingly LPS indicating different ZPD. That is to say "learners who performed at the same level independently may in fact differ dramatically with regard to their learning potential, or responsiveness to mediation" (Poehner et al., 2015, p. 12). For example, learners 1 and 2 have similar actual scores (3) but with mediation learner 1 scored 9, showing a low LPS of 0.46, and learner 2 scored 13, demonstrating

a medium-range LPS of 0.71. Regarding this difference, it can be noted that although the two learners demonstrated similar independent performance, they need different degrees of instructional help as they continue to develop their receptive vocabulary knowledge. Moreover, learners who received higher actual scores than did other learners (3, 6, and 10) improved differently under mediation and hence gained different LPS levels. learners 3, 6, and 10 have similar actual scores (8) but with mediation learners 3 and 6 scored 12 and 10, showing a low LPS scores of 0.5 and 0.37, respectively. However, learner 10 scored 17 under mediation and gained a medium LPS score of 0.81.

It should be taken into consideration that actual scores demonstrate an already developed ability in the time of assessment. They do not reveal learners' ZPD which, as Vygosky stressed, is vital for diagnosis and future learning and teaching. Reporting actual and mediated scores, on the other hand, gives insight into a learner's incomplete and potential abilities. LPS completes this by quantifying the observed changes, the same as a gain score, but brings forward the results in relation to the maximum possible score. In this way, a learner with low actual score is not harshly judged and may still be accepted to have a high LPS, as is the case with learner 2 shown in Table 6. Similarly, Poehner and Lantolf (2013) argued that actual scores do not directly reflect learners' abilities because identical actual scores do not inevitably map onto the same mediated scores. According to their study, of the three learners (6, 13, and 14) who produced the same actual score of 16 on the listening test, "learners 13 and 14 produced similar mediated scores – 29 and 28, respectively – while learner 6 produced a much higher mediated score, an indication that the learner responded more favorably to mediation" (p. 335). Importantly, while some learners with high actual scores did not improve as much under mediation and thus produced medium level LPSs, some other learners with low actual scores did better under the mediation. It can be discussed that actual scores are only able to uncover the abilities that have already matured and do not uncover the abilities that are developing or need to be developed. In this sense, traditional assessments miss the opportunities to enhance learners' ability-in the present case, vocabulary knowledge.

Table 6

The Gain Scores and LPS of Learners in Non-Dynamic and Dynamic Sessions

Learners	*Gain score*		*LPS 1*
	Independent performance NDA1-NDA2	Mediated performance DA1-DA2	
1	3	9	0.46
2	3	13	0.71
3	8	12	0.5
4	4	15	0.81
5	4	7	0.31
6	8	10	0.37
7	4	5	0.18
8	5	8	0.34
9	4	12	0.62
10	8	17	0.81

To provide evidence of development and subsequently learning, data from T session and its comparison to DA2 were presented. Table 7 sheds light on learners' ZPD over DA2 and T. The LPS scores range from 0.70 to 1.06. It is noticeable that all learners showed improvement in the T session indicating that they had development over time (two weeks). Moreover, it can be noted that learners with similar mediated scores developed their receptive vocabulary abilities differently. For example, learners 3 and 4 gained 24 in DA2 and gained 30 and 37 in the T session after two weeks, respectively. First, it should be mentioned that all learners developed their vocabulary abilities, showing transfer of new skills over time and to new items. Furthermore, the LPS levels of the learners give evidence of changes in their ZPD, which means learning has happened. For example, learner 10 scored 20 and 27 in DA2 and T sessions respectively had a LPS score of (0.70), indicting changes in his/her ZPD. Learner 4 scored higher than the others in the T sessions with the high LPS score of 1.04, showing the internalization of the mediation provided in the enrichment phase. That is to say the learner required little or no mediation in the T session.

Table 7
The Scores and LPS of Learners in Dynamic and Transfer Sessions

Learners	*Mediate performance DA2*	*Mediated performance T*	*LPS*
1	22	35	1
2	26	33	0.83
3	24	30	0.75
4	24	37	1.04
5	18	33	1
6	20	34	1
7	15	33	1.06
8	21	34	0.97
9	21	35	1.02
10	20	27	0.70

It is worth mentioning that a significant and high correlation (r = 0.85, p = .00) was found between LPSs and transfer scores, indicating a direct mapping across scores. A comparison of transfer scores on each LPS level was also calculated. Table 8 demonstrates the descriptive statistics of learners' transfer scores at different LPS categories. As expected, learners with high LPS gained higher mean for transfer scores followed by transfer scores of medium and low LPS levels.

Table 8
Mean and Standard Deviation of Transfer Scores Grouped by LPS Range

LPS range	*Mean (SD)*	*N*
High	1.02 (0.025)	6
Mid	0.85 (0.111)	3
Low	0.70	1

Therefore, Mann-Whiney U tests were run to check the significance of the differences. The result of Mann-Whiney U test revealed significant difference (z = -2.36, p = .01) between the high and mid ranges. However, since only one score fell into the low range, no comparison could be made between the high and low ranges and the mid and low ranges. Findings from correlation and the comparison of mean scores notify that LPS is promising in predicting learning. Poehner et al. (2015) concluded that learners, regardless of their LPS, generally benefited from mediation and were able to transfer their abilities to a text that was different from the one they had practiced.

Conclusions

This study sought to indicate to what extent DA can diagnose and develop learners' receptive vocabulary. Results demonstrate learners' independent and mediated performances. Findings of the study are promising in giving insight into the learners' ZAD and ZPD. According to the results, learners' independent scores could not give a complete picture of learners' abilities. It is also not possible to diagnose learners' areas of difficulties with merely focusing on actual scores. The results of the study pinpointed that learners, regardless of their unmediated performance, generally benefited from mediation. Moreover, mediation in the form of collaborative dialogue helps to diagnose and promote learners' receptive vocabulary as shown in this microgenesis approach. The information from transfer scores also uncovers evidence of learning and data form LPS predict how learners probably respond to future instruction.

Stakeholders are thus advised to take into consideration not only the actual scores but also the mediated scores. It should be noted that learners may demonstrate similar level of actual scores but to reach their potential they need different instructional supports. As Vygotsky stated, one's potential abilities can be uncovered through mediated participation in activities with others. It is suggested that LPS is regarded "as potentially quite relevant to placement decisions whereby learners receive instruction that is complementary not to their level of actual development but to their level of proximal development" (Poehner & Lantolf, 2013, p. 337). However, it is recommend that the degree of prediction by LPS be empirically explored in the classroom. One of the limitations of the study is related to the reading texts applied to familiarize learners with the target vocabularies. Since these texts were written by a non-native speaker, this may threaten the authenticity of the texts. Moreover, in the analyses of learners' responses during DA and T sessions, only the number of hints was considered to score learners and the types of hints were not considered. Concerning the analyses described above in relation to the effectiveness of the dynamic assessment procedures in T session, it should also be noted that while more difficult, longer and more cloze passages (N = 3) were presented to the learners in T session, they scored noticeably higher as compared with

the DA2 session. This can be explained with reference to the fact that the difficulty level of words in T session was comparable to the ones in DA session. Regrettably, this is an oversight which can only be addressed in future research.

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