DYNAMIC ASSESSMENT OF EFL LEARNERS' LISTENING COMPREHENSION VIA COMPUTERIZED CONCEPT MAPPING

By

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ABSTRACT

In Vygotsky's theory, learner's Zone of Proximal Development (ZPD) and autonomous performance could be further developed through social interaction with an expert. Computerized concept mapping enjoys the advantage of meeting learners' differences and therefore can be applied as a scaffold to support learning process.Taking a dynamic assessment approach, the present study surveyed the adequacy of computerized concept mapping as a scaffolding tool for the development of the two EFL learners' ZPD in the listening comprehension ability. The two learners, whose main problem with understanding listening passages was connecting the main points, were subjected to ten DA sessions and were involved in making concept maps for the listening passages. Results of this qualitative study indicated the movement of the learners along the continuum of mediation internalization to get closer to the self-regulation extreme which in turn denotes their getting higher levels of ZPDs of listening comprehension ability. This study implies that the constructivism nature of learning can finally lead to handing over the more autonomous and independent functioning to students. The findings of the study will shed light on compatibility of computerized concept mapping as an example of new technologies with dynamic assessment of listening comprehension and captures the microgenetic changes learners went through in getting higher levels of listening comprehension ability

Keywords: Computerized Concept Mapping, DA, Listening Comprehension, Mediation.

INTRODUCTION

A concept map has been defined as a diagram which shows the relationships among different concepts. Concept maps, as some graphical tools, have been used for organizing and representing knowledge (Novak & Canas, 2008). They include notes or concepts, usually placed in circles or boxes, and lines show the relationships between at least two concepts which establish propositions. Nodes and links are labeled using a key or brief text, which explains more about them. The concept mapping technique was originally developed by Joseph D. Novak and his colleagues at Cornell University in the 1970s (Novak, 1977). The bases of concept mapping are in Ausubel's learning and assimilation theories. Central to the Ausubel`s meaningful learning theory is connecting newly acquired concepts to the familiar ones have already been established in learner's cognitive structure (Ausubel, 1968). Assimilation theory also denotes the hierarchical structure of a concept map from an abstract level to a more specific level and facilitates the comprehensiveness of information (Ausubel et al., 1978). Due to the rapid development of new technology, concept mapping is no longer limited to the paper-based drawings. Students, today are able to modify, print and share their concept maps in almost no time via computerized concept mapping tools. Teachers also can evaluate their products easier (Hwang, Wu, & Kuo, 2013)

1. DA and Computerized Concept Mapping

Originally developed from Vygotsky's theory of mind, dynamic assessment combines assessment and instruction and aims at promoting learners` ability and performance through providing them with the help that is in line with their changing needs (Poehner, 2008). Dynamic assessment aims at modifying learners` performance using materials and instructions which elicit higher levels of achievement (Embretson, 1987). Despite the non-dynamic (traditional) assessment tradition, dynamic

assessment focuses on both the product and processes of development.

There are two general approaches of applying dynamic assessment. The first approach, which is called interactionist, focuses on Vygotsky's qualitative and interpretation of the ZPD. The most prominent advocate of the interactionist approach is Reuven Feuerstein (Feuerstein, Rand, & Hoffman, 1979), at the heart of whose approach is reporting some Mediated Learning Experience (MLE) or Learning Related Episodes (LREs). Interactionist approach is used to capture the moment to moment changes or microgenetic developments (Vygotsky, 1987) learners go through in developmental programs. Lantolf (2000) believes that microgenetic development is about changes and re-organization in mediation and assistance that learners receive in a short enrichment program. The second general approach of dynamic assessment is called interventionist. It has a qualitative nature and a psychometric orientation. It is usually implemented using the pre-test mediation post-test approach which makes it similar to the experimental research.

In the last decade, the popularity of the computerized concept mapping technologies has further provided a more efficient way of supporting learning. Computerized concept mapping systems have the advantage of meeting learners` differences and therefore can be applied to further support learning process (Hwang, 2003). They can encourage co-operative learning contexts (Kwon & Cifuentes 2009), in line with Vygotskys sociocultural theory of mind central to which is the point that higher forms of thinking are mediated by human`s interactions and physical and symbolic artifacts. Moreover, computerized systems enjoy higher calculation speed and analysis ability which provide multidimensional organized information for diagnosis, remedial instruction, and learning Ruiz-Primo,Shavelson &Schultz(1997).

Given the reported efficacy of the computerized form of concept mapping in developing literacy skills (e.g., Birjandi, Estaji, & Deyhim, 2013) the study further surveyed its effectiveness in dynamic assessment of listening comprehension and in doing that, used the interactionist approach which enabled expert to depict a clearer picture of learners` performance and the assistance they received which supported the microgenetic developments they had. Therefore, the study used some learning related episodes taken form the interactions of learners and expert.

2. Literature Review

2.1 Concept Mapping in Listening Comprehension

As for the application of concept maps inside the educational area in general and listening comprehension in particular, one can point to their usage in organizing and presenting information in a more systematic way. Functionally, concept maps are also considered is scaffolding tools that support learning and assessment. Nunan (1999) `s research showed that concept mapping along with other techniques such as being familiarized with the key words and notions resulted in deeper listening processing and a positive effect on learners` listening comprehension. Similarly, in a study conducted by Sahin, Aydin and Şahin (2009) comparison of the traditional method of teaching listening comprehension with the computer based concept mapping technique revealed a higher achievement on the side of students through computer based concept mapping instruction. Their study implies that even taking short courses of concept mapping improves learners` listening comprehension. In Fahim and Amjadiparvar's (2012) study, Iranian EFL learners` performance on listening tests were compared based on the type of instruction they received. Teacher of the control group, just introduced students the new words and phrases of the listening passages and then students listened to them, while teacher of the experimental group in addition to that, constructed concept maps for the listening passages too. Results indicated that listening performance can be improved through the utilization of the concept mapping strategy. They could also demonstrate that during teaching activities, teachers can serve as experts who know the in-depth conceptual structure of the learning content and therefore have students follow a guided learning route. Sabbaghan and Ansarian (2013) explored viewpoints of 146 elementary EFL learners on using concept maps to improve their listening comprehension.

Subjects of the experimental group in their study were introduced concept mapping and had to fill out a questionnaire that evaluated their attitude toward concept mapping. These learners were then subjected to eight sessions of working on Key English test listening paper, and then were asked to fill out the attitude questionnaire toward concept mapping again. According to their findings, concept mapping could positively influence the listening comprehension ability and viewpoints of the experimental group.

In Vygotsky's view, potential skills of learners can be further developed through interaction with an expert who provides them with the right amount of support. Based on his view also, ZPD or the difference between learners` independent level of performance and learners` level of performance with mediation, can be developed so that learners get higher levels of knowledge and use the internalized knowledge in new contexts. Within ZPD and through interaction with expert cognitive development and self-regulation also occur (Birjandi & Ebadi, 2012). As learning supporting tools, concept maps can be used as a scaffold to help learners understand or to consolidate their Educational experiences. Concept maps could also be explored as mediation tools to move learners' ZPD beyond their current capacities.

3. Objective of the Study

The present study tried to fill the gap with regard to the exploration of the adequacy of computerized concept mapping as a developmental tool to promote EFL learners` listening comprehension ability. The study limits its analysis to the issue of how the negotiation of corrective feedback or other regulation, in students` related ZPD lead to the promotion of their listening comprehension. That is, this study explored the developmental changes of EFL learners` listening comprehension and how they undergo such developments. More specifically the research aims at answering the following research question:

R1: How does the DA-based computerized concept mapping contribute to the microgenetic development of EFL learners' listening comprehension?

4. Method

4.1 Participants

The participants of the study were two female University Graduated students in TEFL. They were both graduated from Razi University, Iran, one year before conducting the study and had a good knowledge of general English (its Grammar and Vocabulary). Participants were selected among a group of TEFL students who took the TOEFL test (for the purpose of being employed as English teachers in one of the most famous language institute in Iran) and found a need of mediation for the development of their listening comprehension ability. Based on the results of the listening section of the TOEFL, they all got scores lower than 50 and their score range was 22 (41-23=22). As the study aimed at mediating listening comprehension ability through computerized concept mapping, an interview had been conducted before deciding on the main participants in order to find those whose performance could be performed with concept mapping. The two selected students were found to have a noticeable difficulty with making sense of the passages; they were able to recognize most of the words of the listening passages but at the same time failed to get a clear understanding of them. Participants of the study were then subjected to ten DAsessions of listening comprehension development through computerized concept mapping.

5. Data Collection Procedure

Following DA framework and selecting mediation as the main developmental strategy, the study data were collected and analyzed qualitatively. Before getting started with DA sessions, both students were familiarized with the concept mapping strategy and the software were going to be used in the program. During the first four sessions of development program, each learner listened to some passages, whose lengths varied from one to two minutes, and were asked to draw concept maps for them. Later on, students were exposed to longer passages and expected to have an acceptable performance at them too. The listening passages were the same for two students and selected from the Barron's IBT TOEFL (14th edition) book The point worth mentioning here is that the data gathering stage was divided into two stages in which the data related to each student`s performance were collected

separately. The reason is that in such condition students felt more comfortable and were supposed to remain unaffected by each other's performance.

5.1 Concept Mapping Tools

This study had the benefit of Mind mappers (12 ES standard and/or 14 Arena).These software, compared to the other and older versions of mind mappers, in addition to having the qualities of easy application and modification, provided the users with more patterns of concept mapping and enabled them to share and print their products.

5.2 Mediation Moves Taxonomy

Mediation moves taxonomy or the collaborative frame of assistance offering, presented in Table 1, was emerged from the interactions with students and was flexible to the length and difficulty level of the passages so that for the longer and specialized ones (such as a passage on the mimic phenomenon in biology) the first stage was done twice. Mediation in this study was started with its most implicit form (level 0), where no collaboration happened and the mere presence of the mediator (Aljaafreh & Lantolf, 1994) was enough for each student to get the thing done that is, constructing the concept map independently. Mediation then continued with providing students with hints and prompts (levels 1 to 4) and finished with the most explicit form of mediation in concept mapping (level 5). Table 1 represents more data in this regard.

Following Aljaafreh and Lantolf (1994), this study had two developmental criteria or two ways of assessing mediation: the first, a more traditional product-oriented criterion, was to search for signs of improvement in the students' listening comprehension with regard to short passages in subsequent tasks. Here concern focused on a reduction in frequency or complete eradication of the errors as well as on the generalization of development beyond the specific passages for which the students had already received help. The second criterion was related to the learners' progression in their ZPDs - do the learners show signs of progression from reliance on the mediator, or other-regulation, and towards reliance on the self, or self-regulation ? This denotes the microgenetic development of the learners was determined by the frequency and quality of help that they elicited from the mediator in getting the tasks done in subsequent episodes in the same developmental session and in subsequent sessions dealing with new passages. Vygotsky (1987) argues that microgenetic (movement toward self-regulation) development has to do with the cognitive changes occuring in relatively short period of interaction and in some specific socio-cultural setting.

Table 2 captures the critical features of each level of internalization based on the frequency and quality of feedback (Aljaafreh & Lantolf, 1994; Birjandi & Ebadi, 2012) students needed when engaging in tasks.

5.3 Other Regulation

Dynamic assessment involves learner`s movement across three stages of regulation. At the first stage which is called other regulation the learners need an expert in order to recognize their problems and modify their performance. In other regulation process the learners skip the ZPD or the distance between their present level of development and autonomous performance and that of the mediator. ZPD captures not only learners actual level of development but also the degree to which they are responsive to the prompts and mediation they receive which is a realization of their future development (Xiaoxiao & Yan, 2010).

Other regulation stage in this study was categorized into three main levels. The first level or totally ineffective

1. Mediator indicates that there may be something wrong with the concept map and plays the listening passage again.

2. Mediator plays some specific parts of the listening text to signal the points that need more attention.

3. Mediator explicitly determines concept(s) or link(s) of each part that need modification and plays each part again.

4. Mediator rejects unsuccessful attempts of the students for correcting errors and plays the related parts.

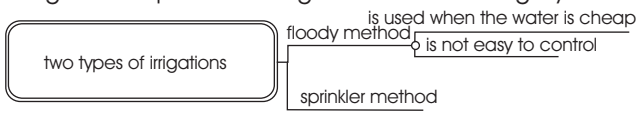
5. Mediator corrects the problematic concepts and links of the concept map herself after repeating and/or translating the related parts.

Table 1. Mediation Moves Taxonomy

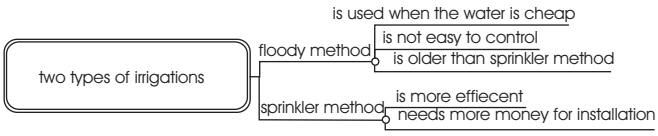
Other regulation	Partial regulation	Self- regulation
Totally ineffective mediation Still ineffective mediation Absolute mediation dependence	Little or no mediation dependence	Mediation independence

Table 2. Realization of Each Level of Internalization From Other-Regulation to Selfr-Regulation

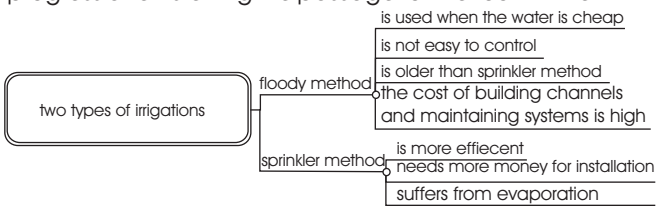
mediation stage is where at which the learner, despite getting all possible levels of mediation, was not able to draw the concept map correctly. Here is what authors mean by the totally ineffective mediation stage, according to an example taken from the real performance of student 2. At the first level of mediation, she could recognize the two main types of irrigation methods, along with two points with regard to the first category.



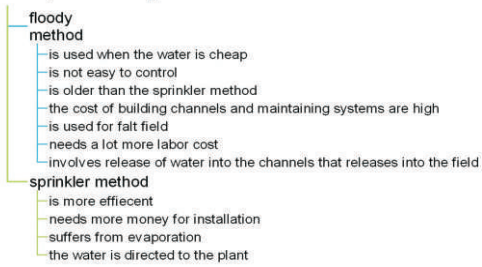
After listening to some parts of the listening passage (receiving the second level of mediation) student 2 could add more details to the concept map (the last branch of the floody method and the two branches of the sprinkler methods).



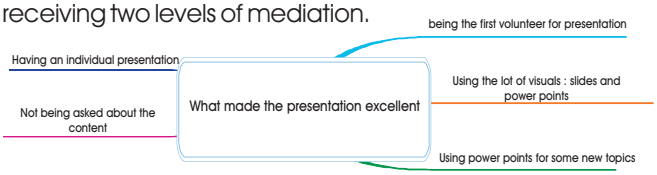
Upon seeing the still uncompleted concept map, the researcher let student 2 receive the third level of mediation (at this stage, the student herself was aware of the point that the concept map needed more details). The following version of the concept map shows that she had some little progress after listening the passage for the fourth time.



As the fourth levels of mediation did not have any effect on the performance of student 2, the researcher herself repeated the missing parts and completed the concept map. The point worth mentioning is that she believed that she had done the job and the concept map was comp



At the level of still ineffective mediation, the learner was able to notice that there is something wrong with the concept map but even with mediation was not able to do the correction process. That is, she had some degree of responsiveness, but it was not enough to do the concept map. The problem here was mainly about understanding some words, phrases and/or sentences of the listening passage. The following concept maps shows how student 1 made progress at some consecutive levels of mediation but still could not understand some points of the passage and therefore completed the concept map despite being aware of the existence of some problem with it. The first concept map here shows the result of her effort after receiving two levels of mediation.



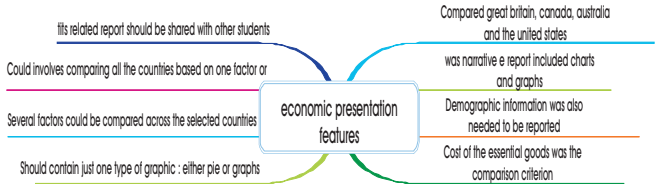
After listening to some parts of the passage preceded by the researchers explanation of the absence of some points in the last form of the concept map (receiving the third level of mediation), the student added another two branches to it (the last two branches at the left and right sides).

At the next level of mediation, student 1 could only combine the last two branches on the left side, and therefore the researcher read the part that student could not understand despite making a lot of effort (the last branch at the left side) and let her complete the concept map.

At the stage 3 of other regulation, the learner was able to notice the wrong part(s) but could not correct it without mediation. This is called absolute mediation dependence stage as it shows student`s success in doing the job only when she receives (at most) the first two levels of mediation.

The following concept map selected out of the student 2 performance can be regarded a realization of the stage 3. At the first level of interaction, student could do almost half of the job as it is represented in the following.

The completed concept map came up when student 2 received the second level of mediation.



5.4 Partial Regulation.

At the partial regulation (little or no mediation dependence) stage the learner needs partial support of the expert. She does not need assistance to either recognize or correct the errors but his/her performance has not been automatized yet. That is, sometimes she is in need of receiving mediation. The concept map, as is clear from the pictures, needed only one level of mediation. Figure 1 is the result of student 1 before starting collaboration and Figure 2 shows the intended concept map.

5.5 Self-Regulation

Self-regulation (mediation independence) stage shows the knowledge and independence the learner has gained in order to deal with the problems. This stage also denotes the ability she has gained for providing feedback on problem solving activities. At this stage learner is supposed to control her response so that her actions results from considering all possible alternatives and shows her intentional selection. This stage also shows that humans are agentive in their

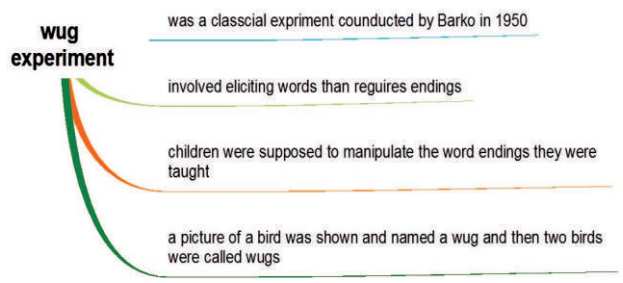


Figure 1. Before collaboration

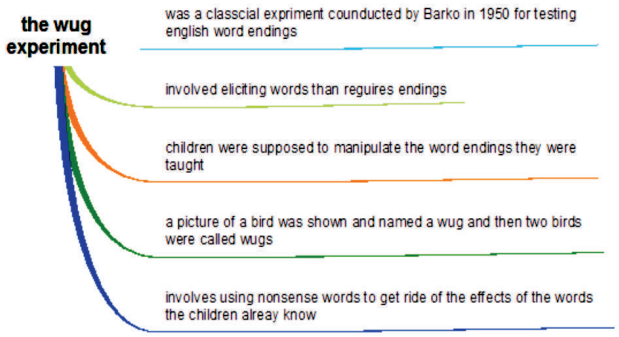
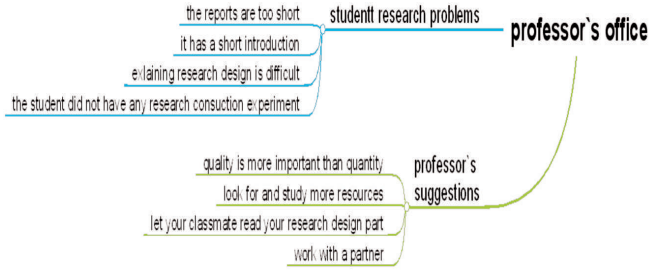


Figure 2. After Receiving the First Level of Mediation

action and they can choose among a range of choices (Pohner, 2008). The following concept map, came up through the third session of development program, describes a student and her professor`s conversation about her research project, was drawn by the student 1 herself without receiving any level of mediation.



6. Data Analysis and Results

Taking an interactionist approach of mediation, the study focused on the learning related episodes that involved interaction between students and mediator in general and those that show the development of students to take the control of the tasks themselves in particular. During the initial sessions of instruction students showed some difference in performance as the same kinds of passage represented different challenges to them. At the surface, at the beginning of the program they both were unable to construct the map for short passages. When starting with the mediation, however, it was revealed that they were quite different at the level of ZPD. Student 1 in most cases was able to get the map done with level 1 or at most level 2 of mediation. The tasks were somehow more difficult for the student 2, as in majority of cases she needed at least mediation at level 3. Inferences about students` ZPD were made based on their initial inactiveness and interaction they had with mediator and the mechanisms of affective

help Aljaferah & Lantolf (1994) introduced, based on which it is essential for mediation to be graduated, contingent and based on the interactions of learners and experts.

6.1 Language Related Episodes (LREs)

The following concept map, taken from the beginning of the program was done by both students in which they were not able to do any specific thing at first. Student 1, however, only needed level 2 mediation. She could successfully recognize some parts needed correction at the level 1 and for the rest used mediation at level 2. Student 2, however, needed more help and could not do it with all five levels of mediation and finally the mediator herself did it. The data clearly shows that at the beginning of the developmental program student 1 was at the fourth level of internalization (little or no mediation independence), while student 2 was at its first level (totally ineffective mediation).

6.1.1 Episode 1: A Concept Map Needed Different Levels of Mediation by Each Student

During the four sessions of mediation student 1 had a noticeable progress with regard to the short passages. She could do most of the concept maps without any explicit help (which equals getting level 5 of internalization or mediation independence). The situation for the second student, however, was a little different as her progress was not very tangible and in most situations needed mediation through interaction (usually up to level 3) which equals level 3 of internalization (absolute mediation dependence).

After the fourth session, when it came to working on longer passages. Both learners had some regression in their performance, although in different lengths and duration. They both seemed to lose the connections among different ideas mentioned in the whole passage and even in some cases forgot almost all about what they had heard. The second episode here reflects response degree of student 1 to mediation she received when listening to a 4 minutes long listening passage about ballet and horse

ballet as a subcategory of it. After the first time of listening student 1 was only able to draw the following figure.

6.1.2 Episode 2: Student 1, Session Five, Level 0

Upon seeing student`s strange performance, mediator decided to have her listen to the passage again (level 1 of mediation). This time the result was more promising, but still far away from the intended form of the concept map. Figure 2 shows that she was able to get more specific details about each branch of the concept map.

6.1.3 Episode 2: Student1, Session Five, Level 1

Student at the second level of mediation was allowed to listen to the passage again since she had problems related to the two branches of the map, which represented the whole passage almost (level 2 of mediation). Mediation at this level also did not help her get the whole message. Then, she was about to undergo other levels, too. Figure 3 shows the result of her third attempt to get the passage. As it is clear, she changed the label of the first branch and put it as a subcategory of the (balley) ballet. She also added other points to the same branch and one point to the second branch.

6.1.4 Episode 2: Student 1,Session Five, Level 3

At the third level of mediation student1 did not show any progress and therefore the mediator did the rest and corrected the parts that needed modification. Figure 4 shows what was intended to convey by the whole listening passage. It shows that the first and the second branch were still in need of the last and the last two points to be completed respectively.

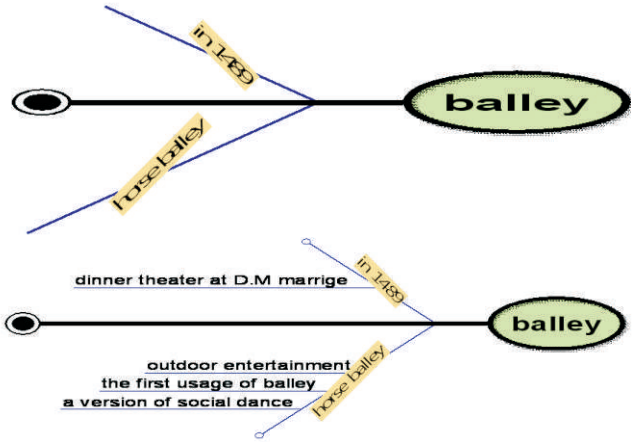


Figure 3. Results of the third attempt

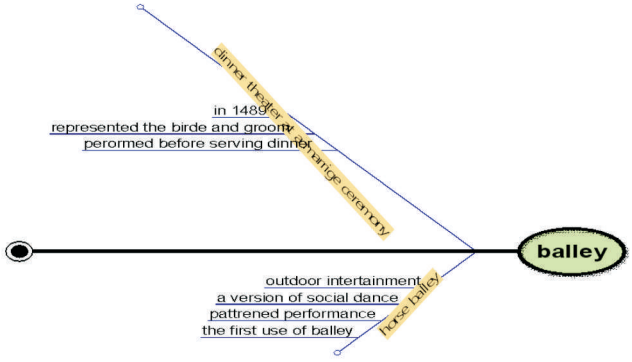


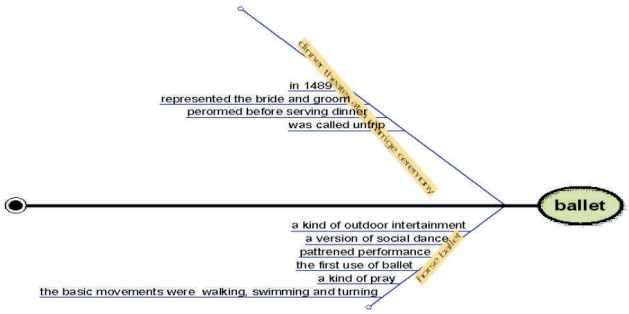
Figure 4. Listening Passage

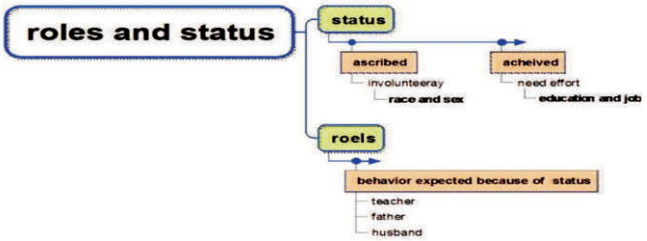
6.1.5 Episode 2: Student 1, Session Five, Level 5

The process of working on the long passages shows the regression of student 1 from level 4 of internalization (little or no mediation dependence) to level 1 (totally ineffective mediation). In order to check the point with regard to the short passages, she was given the chance of working on short passages as well which confirmed that she was at the level 5 of internalization (mediation independence). Her performance on long passages however, was very poor. The student 1 continued with the problem for the whole session 5 at the end of which the mediator decided to change the predetermined route and let her work on passages which were at average length (at most 3 minutes) at first and then little by little the longer ones emerged. Results were at that stage somehow better and helped emerging the signs of progress. She could get closer to her performance the same as short passages gradually. The second episode was taken from the eighth session of interaction of student 1 with the mediator as they both listened to a sociological passage which was almost four minutes long. Student 1 then constructed the following concept map.

6.1.6 Episode 3, Figure 1, Session Eight, Student 1, Level 0

In this episode too, the student could not complete the





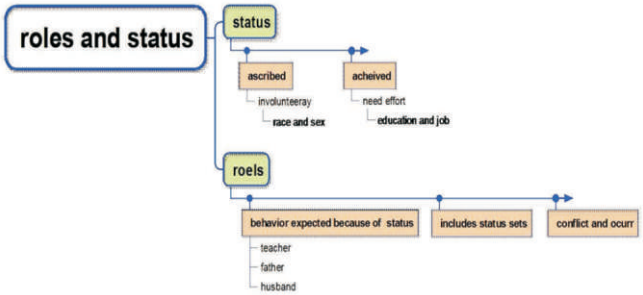
concept map and some mistakes were obvious in her categorization. The researcher then provided her with the second chance of listening (level 1 of mediation).

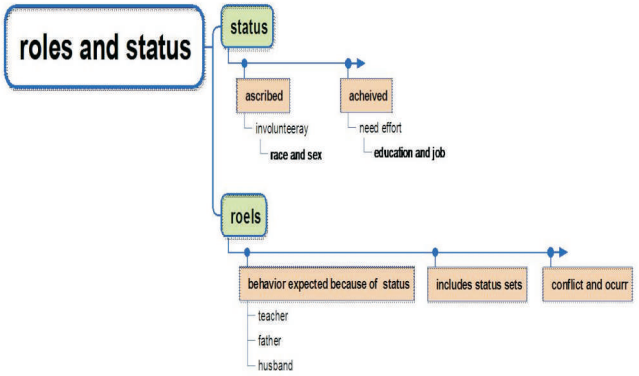
6.1.7 Episode 3. Figure 2. Still Uncompleted Concept Map, Student 1 Session Eight, Level 1

After listening to the passage for the second time, student could add some other details (shown in the last two categories of Figure 2) to the "Roles" part but there were still some points which needed to be paid attention. So, the researcher provided the next level of mediation and let her listen only to some specific parts of the passage again. This resulted in a better performance so that she could do it (Figure 3, level 2 of Mediation). Comparing Figures 2 and 3 shows how student 1 could do the task by adding another subcategory and its whole related information to the statues part and could add more information to the role part.

6.1.8 Episode 3, Figure 3. Completed Concept Map, Student 1, Session Eight, Level 2

Episode 3 was an episode that needed the first two levels of feedback. This and some other episodes were taken from the interactions to show the relative progress of student 2 in connecting ideas and getting a better understanding of the passages. This denotes the partial development of the student from level 1 of internalization (totally ineffective mediation) to the level 4 (little or no mediation dependence), which can be regarded as a sign of passing

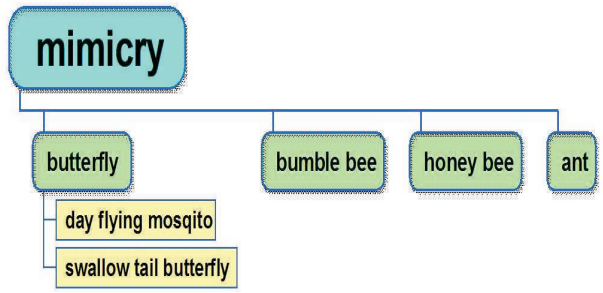




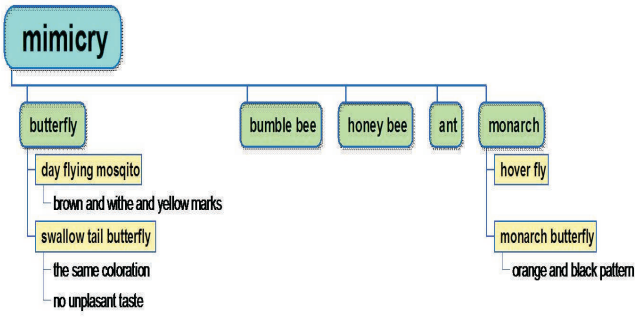
through other regulation stage to get the partial development level.

Student 2 also had problems mainly with the passages containing information about many different items. Episode 4 here contains some figures capturing her actions after her first listening to a passage about common forms of mimicry among insects, and all other levels of mediation she needed to get the concept map done. The following Figures show the level 0 to level 4 of the Episode 4, Session 5.

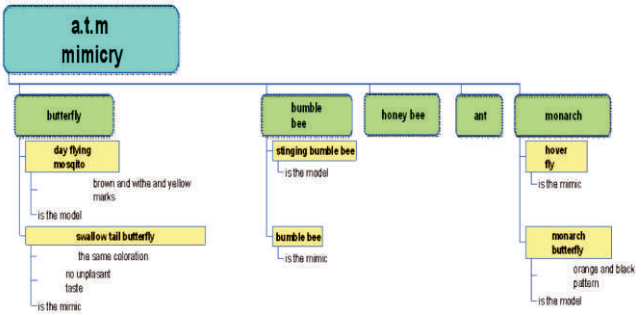
6.1.9 Episode 4:Session Five, Student 2 Level 0



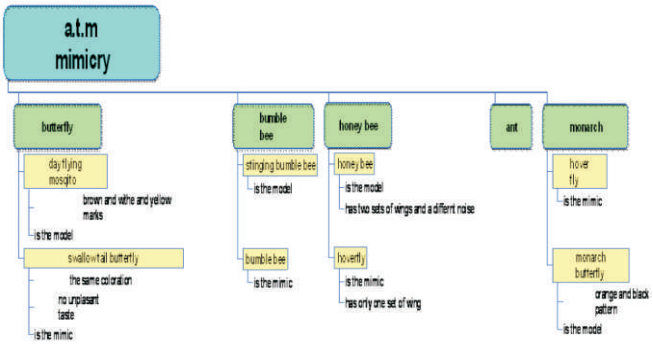
6.1.10 Episode 4:Session Five, Student 2,Level 1



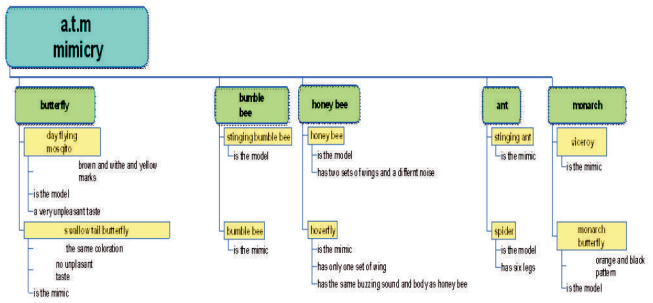
6.1.11 Episode 4: Session Five,Student 2,Level 2



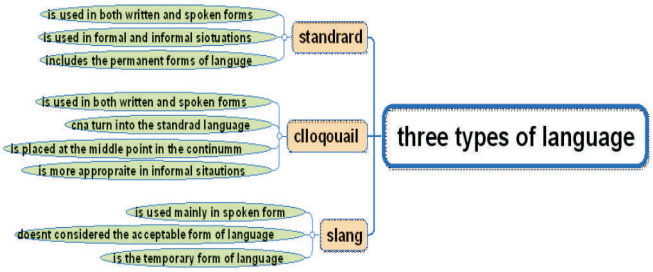
6.1.12 Episode 4: Session Five,Student 2,Level 3



6.1.13 Episode 4: session five, student 2, level 4



The above piece of evidence showed that student 2 experienced regression from level 3 of internalization (absolute mediation dependence) with regard to short passages to get level 1 (totally ineffective mediation) with regard to the longer ones. Development of the student 2 with regard to long passages came up much later than student 1. She needed more work and of course mediation. Although she did not experience the sudden movement to the long passages as student 1, she had the same kind of regression in her performance. Her development could be noticed in the following concept map which requires 3 levels of mediation.



6.1.14 Episode 5 : Student 2, Session 10

With regard to pretty long passages then we may be able to say that she moved from level 1 (totally ineffective mediation) of internalization and got to level 3 (absolute mediation independence) of internalization. So, even though she did not get the self or even partial regulation stage, her movement along stages of other regulation is quite obvious. Although at the end of the developmental program she was not able to do any concept map without mediation, she could notice that her concept map is wrong or incomplete. Given that, there must be a difference between the two students: student 1 could get closer to the self-regulation stage while the second one was more away or at least needed more work to get the same place as the student 1.

Students after the end of the program were tested again with regard to both the short passages and the longer ones. This was done in order to investigate the degree of mediation internalization each student achieved during the developmental program and the degree to which they were able to transfer their newly acquired knowledge to new tasks (Pohner, 2007). For the student 1 as one may suppose, the results were more promising. She could apparently meet the first developmental criteria with regard to short passages, as in almost all cases she did right on the task of concept mapping and needed no help. For the longer passages, as mentioned earlier she could get the stage of partial regulation along with some signs of getting all the things independently which were of course not enough to consider them the signs of getting the self-regulation. As for the second student, clear signs of development were obvious, too. With regard to the short passages she could move from level 1 (totally ineffective mediation) of internalization to get level 3 (absolute mediation dependence). As for the longer passages, she moved from level 1 of ZPD to get level 3, too. According to Aljaafreh and Lantolf (1994), internalization is the fundamental condition of evolution from social and external functions to internal and mental ones. In line with the sociocultural theory of mind (Vygotsky, 1987) internalization process denotes microgenetic development of individuals so that as a result of interactions they get the related mental processes and probably change them followed by their reproduction.

7. Discussion

The initial difference between students in terms of level of internalization with respect to the short passages disappeared temporarily when it came to working on the longer passages. Both students had some regression in their process of development but since student 1 had demonstrated a higher level of performance, her regression was more noticeable. Vygotsky (1986) believes that development is not a revolutionary and linear process. It is gradual and step by step in its very nature. Then, it may encompass both progression and regression, though both of them lead finally to learners' development. Mediation at the next sessions of the developmental program helped students to gain almost same level of performance on short passages. Student 2, however, had not fully internalized the mediation at either the short passage stage level or that of the longer passages. But, given the degree of development both students experienced, it would be safe to say that the developmental program was more effective for student 2 and changed her ZPD more than student 1. Student 1 had development as much as only one stage at both short and long passages, while student 2 experienced two stages with regard to each of them. Vygotsky (1987) considers the significance of recognizing learners` ZPD providing them with the chance of improving mental functioning and development.

The microgenetic approach that was used in the study helped exploring the changes that occurred and their identification. Tajeddin and Hosseinpur (2014) believe that the whole point with regard to microgenetic development is tracing the changes as they happen. The mediation provided in the developmental program helped students to meet the first developmental criteria (especially with

regard to student 1) and move from the stage where in the responsibility of the students' performance was (with respect to student 2, unequally) distributed between students and the mediator and get the level at which they get more responsible to their own performance and become closer to the internalization stage. According to Van Lier (1988) mediation helps learners move away from reliance on the expert toward reliance on self.

Conclusion

This study tried to investigate the efficacy of the computerized form of concept mapping with regard to the Dynamic Assessment (DA) approach of developing listening comprehension ability. The DA approach used in this study could help recognizing the potential difference between students who were the same in the first sight (Birjandi & Ebadi, 2012). It could also make the microgenetic and overall development of learners more tangible as it provides some stages and criteria against which one can assess students' ability. According to the results of the study, computerized concept mapping facilitated each student`s performance with regard to constructing maps and helped the mediator assess their products easier, which in turn resulted in providing them with right amount of assistance. Students felt more confident and comfortable when working with computers and believed that in this way, their instruction is more systematic and organized. Prinsen et al. (2009, p. 1) stated that "*…to involve students in productive dialogue, simply providing a medium is not sufficient.*" They further argue that "*Learner involvement is facilitated by the instructional design principles that are embedded in the larger computerized environment.*" What all that means is that it is important to provide learning supports during the cooperative learning program, and the provision of concept-mapping strategies and tools could be an effective support to students.

Implication

This research revealed some crucial practical implication for future implementations of computerized concept mapping. The study supports philosophical notions of the social constructivist learning and states that with regard to listening comprehension ability co-operation will lead to development. This indicates that working on maps collaboratively can engage learners in social interaction with others and create a "Zone of Proximal Development" (Vygotsky, 1987) in which learners can negotiate shared meanings and promote their performance with the assistance of others.

Limitations

At the end, it is important to acknowledge that this study has some limitations too. First, it is descriptive and correlational in nature. The important prediction of achievement from working on computerized concept maps does not necessarily mean that the latter causes the former. However, the results are promising and in need of further research under controlled conditions to ensure the effect of concept mapping. Second, the study relies on observation, due to the limited resources and the complex nature of measuring cognitive functions. Thus, the generalizability of its results is limited. Further research in addition to comparing the utility of computerized concept mapping in dynamic and non-dynamic approaches of developing listening comprehension, may tap on the development of certain listening skills and the connection between them. Comparing the adequacy of computerized concept mapping as teaching and testing tools and the merits and demerits of them in each filed along with reflecting the viewpoints of its users also seem to contribute to the literature on the utility of computerized concept mapping.

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