The Effect of Brain-Based Learning on Developing Some Speaking Skills of Egyptian EFL Secondary School Students

Amal Hashem Khalil [1*], Bahaa El-Din Elsayed El-Nagar [1], Michael Abd El-Mesih Awad [1]

[1] Department of Curricula and Methodology, Faculty of Education. Zagazig University, Zagazig, EGYPT

* CORRESPONDENCE: ✉ amal_nader2003@yahoo.com

ABSTRACT

The present study aimed at investigating the effect of brain-based learning (BBL) on developing some EFL speaking skills of secondary school students. The quasi-experimental design was adopted. An experimental group and a control group, of 25 students each were drawn randomly from Gamal Abdel Nasser secondary school for Girls in Zagazig, Egypt. The instrument of the study was an EFL speaking test. A selected group of BBL strategies was utilized to improve the speaking skills of the experimental group students for seven weeks. The students of the control group received regular instruction. By the end of the experimentation, the speaking test was administered to the experimental and control groups. The scores of the experimental group, control group, pre- and post-scores of the experimental group were analyzed. The results of the study indicated that 1-The experimental group surpassed the control in the post administrations of the EFL speaking test, 2- The experimental group showed a significant improvement in the post administrations of the speaking test than in the pre-administrations. Therefore, it could be concluded that brain-based learning had facilitated and accelerated the development of EFL speaking skills of secondary school students.

Keywords: brain-based learning, speaking skills, secondary stage

INTRODUCTION

Speaking is an essential pillar to building up the communication and interaction competencies of foreign language learners. It is the second skill to be acquired after listening. EFL Learners should acquire speaking skills not only so they can pass the exam but also for public use in the outside world. Speaking is a tool for social interaction and reflects students' ability to express themselves accurately and fluently. Al-ma'shy (2011) stated that EFL speaking is the most commonly used skill in class because it is used as part of the teaching of other skills such as listening, reading and writing. As a result, teaching speaking skills should be considered an essential part of English language programs in schools since it is vital as a means of developing classroom interaction. In the same vein, (Afshar & Rahimi, 2014) emphasized that speaking as one of the macro skills must be given special attention and instruction in the context of English as a foreign language. Likewise, Sanaa (2013) assured that English speaking skill is a major sign of students' success among EFL learners.

Despite the importance of EFL speaking skills, reluctance to participate freely in oral activities is clearly observed in students' behaviors (Cheng, 2000). Speaking problems are classified by many researchers into linguistic and affective (Humaera, 2015; Leong & Ahmadi, 2017). The linguistic problems that might prevent students from sharing in conversations include grammar mistake, lack of vocabulary, mispronunciation and mechanics related problems such as fluency and accuracy. The second category is the affective factors

including absence of motivation, absence of self –confidence, in addition to anxiety and shyness. Thus, speaking a foreign language appears to be difficult, challenging, and stressful for the learners.

Brain-based learning has been built on a dozen of principles stemming from neuroscience and cognitive research. The technique was then used as an instructional approach to enhance instructors' ability to teach and accelerate students' learning of expressive as well as receptive language skills of EFL students (Lombardi, 2008). According to (Jensen (2000) brain-based learning is learning in accordance with the way the brain is naturally designed to learn. Jensen (2008) added that brain-based learning is a set of principles and a base of knowledge and skills upon which we can make better decisions about the instruction as well as learning processes. The BBL technique has a dual focus: (i) it encourages teachers to adapt their teaching methods to the learning modes of all students, and (ii) it seeks to create a challenging yet safe emotional climate in the classroom (Connell, 2009).

Brain-based learning proved to be effective for developing various areas in EFL context such as the retention of English language knowledge, academic achievement, critical reading (McNamee, 2011), reading comprehension, writing, and oral fluency (Duman, 2010; Willis, 2008). Jackson (2003) assured that brain-based learning strategies can yield significant and measurable benefits in terms of student performance outcomes. Oradee (2012) added that brain-based teaching improves learners' speaking skills such as fluency and accuracy while they were doing their pair work activities or working in groups in a comfortable atmosphere where students are not afraid to speak and enjoy communicating with their classmates as well as the teacher. Yagcioglu (2014) utilized websites that provide brain-based activities to improve his students' ability to pronounce the new words, speak English fluently and write paragraphs and compositions.

According to Connell (2009) the most important aspect of BBL is that it combines research-based academic interventions and applied aspects of emotional learning. If the students have been introduced to the power of emotional intelligence (EI), they likely would be able to effectively handle anxieties, shyness, anger, fear and the stresses of learning difficulties.

Being a teacher of English, the researcher has noticed that the sufficient interest was not given to EFL speaking skills despite their great importance. Teachers concentrate only on repetition drills and ignore developing communication among students.

Many researchers reported the poor proficiency of EFL speaking skills in the context of the Arab countries, especially in Egypt (Abdelmageed & El-Naggar, 2018; Eissa, 2019; Etomy, 2015; Ghany & Latif, 2012; Torky, 2006). They confirmed that EFL students in secondary stage schools as well as university students in Egypt face a lot of difficulties while speaking. The researcher also conducted a pilot study in which a speaking test was administered to the EFL first-year secondary school students. The results of the pilot study disclosed that the level of the students was low, and they were inefficient as EFL speakers.

The present study aims to investigate whether brain-based learning would improve EFL first-year secondary school students' speaking skills.

Research Questions

In order to tackle this problem, the present study was an attempt to address the following the main question:

Does brain-based learning have a significant effect on EFL first-year secondary stage students' speaking skills?

LITERATURE REVIEW

Speaking

Unlike written language, spoken language involves paralinguistic and prosodic features. These features include voice qualities, speed, loudness, facial and bodily gestures, intonation, correct pronunciation of sounds, stress, rhythm, and pausing (Widiati & Cahyono, 2006). Bygate (1987) indicated that spoken language is more spontaneous, chaos, and disorder form. It may be informal, short and clear sentence, whereas writing is more ordered and coherent structures. Sanaa (2013) conceived that speaking proficiency is influenced by four components of competence; (i) grammatical competence, (ii) discourse competence, (ii) sociocultural competence, and (iv) strategic competence.

Brown (2002) indicated that activities which focus only on limited language structures through simple repetition drills, substitution drills, and slot substitution drills only tax students' short-term memories, with no hope of improving communicative ability. Pardede (2011) reported that speaking skill can be improved through communicative activities which motivate the students and intensify the relationship between the teacher and the students and among the students as well so creating a supportive environment for language learning. The activities that can enhance speaking skills are free discussion, task-based instruction, a jigsaw puzzle, games, problem-solving, dramatization ,role -play, group work , pair work and oral reading.

Brain-based Learning

Principles and strategies of Brain-Based learning

Brain-based learning principles stemmed from neurological research, particularly during the 1990s. Educators and psychologists such as Caine and Caine (2006), Boyatzis, Goleman, and Rhee (2000), Jensen, (2000, 2008), and Sousa (2016) are pioneers as well as forerunners in the BBL movement. These authors have helped with disseminating neurological research into research-based academic best practices. According to Caine, Caine, McClintic, and Klimek (2015) the following are the principles of brain-based learning; (i) the brain is a parallel processor, (ii) learning engages the entire physiology, (iii) the search for meaning is innate, (iv) the search for meaning occurs through patterning, (v) emotions are critical to patterning., (vi) the brain processes parts and wholes simultaneously, (vii) learning involves both focused attention and peripheral perception, (viii) learning always involves conscious and unconscious processes, (ix) We have at least two different types of memory, (x) learning is developmental, (xi) learning is enhanced by challenge and inhibited by threat, (xii) Each brain is uniquely organized.

Brain-based education is the engagement of strategies based on understanding of the various mechanisms of brain functions, to enhance students' achievement (Marope, 2016; Mayer, 2017). There is a global interest in brain-based learning strategies (Connell, 2009). Pickering and Howard-Jones (2007) found that educators in the United Kingdom and other worldwide locations are enthusiastic for the attempts to interrelate neuroscience and education. Willis (2007) reviewed the evidence-based means by which brain-based teaching strategies improve students' memory, learning, and test-taking success.

Duman (2006) emphasized the importance of enriching instruction and learning environment using brain-based strategies to accelerate learning. Such strategies include manipulative, active learning, field trips, guest speakers, and real-life projects that allow students to use many learning styles and multiple intelligences. According to Erlauer (2003) these brain-based strategies should be used in different levels and content areas in class such as: movement, music, personal stories, humor, metaphors, colors, brainstorming that is related with KWL, using project presentation, etc. Prigge (2002) suggested some of the brain-based teaching strategies such as: teaching students about their brains, smart thinking, sleep, drinking and eating, learning preferences as well as establishing a positive atmosphere by using music, laughter and positive visual reminders. The creation of an interactive environment, providing movement, being aware of internal and external attention, engaging emotions appropriately, creating sensory associations, making learning personally relevant, using creative repetition, remembering the importance of first and last, teaching specific recall techniques are among the reported brain-based teaching strategies.

To accelerate learning while applying brain-based learning and a student-centered environment should be used instead of teacher-centered approaches. Hileman (2006) proposed teaching tips to engage the brain. He indicated that the brain is social and learns best while working cooperatively. Hileman's model in the B.R.A.I.N. B.A.S.E.D as follows: Brain's time clock, Repetition, Active learning, Images, Novelty, Be colorful, Automatic learning, Social brain, Elicit emotion, Developing thinking skills.

Tate (2013) added that teachers, as growers of dendrites and synapses should know how students comprehend and retain information. She synthesized 20 instructional strategies that potentiate brain-based learning. These strategies include brain storming, discussion, graphic organizers, visuals, humor, role play, movement, music, story-telling, manipulatives and technology.

All the aforementioned strategies revolve around the following three fundamental instructional methods related to the brain-based learning (Caine et al., 2015):

1. Relaxed alertness (emotional climate) - creating a safe learning environment, to lessen fear and anxiety thus enabling student engagement.

2. Orchestrated immersion in complex experience (instruction) - giving learners a diverse learning experience that include options and a sense of wholeness.

3. Active processing of experience (consolidation) - creating optimal ways to consolidate learning by letting the learners actively practicing it.

Brain-based learning and speaking

Sharma and Sharma (2013) stated that to improve academic achievement of the students, teachers should employ such teaching strategies that aid them gaining interest and achieving good scores. Therefore the teacher must provide such learning experiences that facilitate the overall development of the learner. Brain-based instructional strategies provide such platform to teacher and learner where there is continuous flow of information in threat free environment.

FL learners who use brain-based learning had a better achievement and retention (Duman, 2010; Koşar & Bedir, 2018) . It should be noted that, studies of the brain-based learning can help researchers and educators understand the critical role it can play in the learning process (Haghighi, 2013). Research on brain- based learning has been extremely prolific in the past two decades to develop different areas in language teaching. Köroğlu and Çakır (2017) emphasized the complexity of learning and teaching speaking skill in foreign language education. Teachers and learners should realize that speaking skill teaching needs the same emphasis like other language skills and more student-centered classrooms in which learning is more personalized and collaborative. Oradee (2012) indicated that brain-based learning made positive contributions to the students' speaking skills. Brain-based learning has gained considerable attention and support among educational researchers . Jampamoon (2014) was interested in examining the effects of brain-based learning on six students' speaking ability and studying the students' opinion toward brain-based learning activities via a questionnaire which revealed a positive opinion toward studying English through brain-based learning activities. The participants were instructed through implementing activities based on the 12 principles of brain -based learning. They practiced songs, games and role-play to reduce stress and anxiety which in turn promote their speaking. Similarly, with a sample of six participants at a higher education institution in Puerto Rico, Farrell (2016) focused on improving the learners' fluency via using the three fundamental instructional strategies (relaxed alertness, orchestrated immersion, and active processing) in the light of Caine and Caine's twelve principles of brain based learning. The researcher concluded that using Caine and Caine's twelve Principles effectively developed students' oral communication fluency; all participants conquered their fears, raised their self-confidence, created strong bonds among the group members, and used their individual strengths to support each other.

Syahbandi (2018) conducted a study to find out the significant effect of Brain-Based Learning toward students' speaking skills at the second grade senior high school at Praia. The researcher utilized brain-based learning as one of teaching technique of Cooperative Learning to reduce students' speaking problems. She viewed BBL as a technique of teaching speaking which make the students interested and helped them to speak. Furthermore, Karimzadeh (2017) investigated the effect of drama-based techniques as an effective brain-based learning strategy on developing speaking abilities of young Iranian ESL learners. The researcher emphasized that drama can not only involve all the learners' senses, but also provide a safe environment where learners can interact with each other in real life situations easily. It involves fun, peer interaction, a teacher as a supporter and a student -centered learning. He concluded that drama –based instructions could be beneficial to enhance speaking abilities. In the Egyptian context ,there is scarcity of research in the area of studying the impact of BBL on speaking skill, to the knowledge of the researcher, one study carried out by Abu-Hashem (2011) who investigated the effectiveness of a training program designed in the light of brain-based learning in developing the listening and pronunciation skills of second year ,Educational section, women's college, Ain Shams University. The program was effective in developing the experimental group students' listening and pronunciation skills.

As a result, there is a bad need which urges the researcher, in the current study, to utilize the power of BBL to improve EFL secondary school students' speaking skills which are neglected to a great extent in the Egyptian schools.

METHODOLOGY

Participants of the Study

The participants of the study were first year secondary stage students. Fifty female students were chosen randomly from Gamal Abdel Nasser Secondary School for Girls at West Zagazig Zone, Zagazig, Egypt. The researcher chose two intact classes: the first class of (25) as an experimental group and the second of (25) as a control group.

To prove the homogeneity between the two groups in speaking skills before administering the program, an EFL speaking test (**Appendix**) was given to both groups. Then Independent Sample t-test was employed to find out any statistical difference.

Table 1. *t*-Values for the Differences between the experimental group and the control Group on speaking pre-test

Skill	Group	N	Mean	St. Deviation	df	t-value	Sig
Overall Speaking Skills	control	25	8.08	4.600	48	0.141	.889
	experimental	25	7.92	3.341			

Table 1 indicates that there was no statistically significant difference between the experimental group and the control one on the speaking pre-test. t-Value for overall speaking skills is (0.141) with significance. 889. This value is not significant at the level of 0.01.

Research Design

The current study adopted both descriptive and quasi-experimental design. The first was used to review the previous literature and studies related to brain -based learning and speaking skills in order to achieve the aim of the study. The second was used to apply the program based on brain-based learning and two homogenous groups were selected to represent the experimental and the control groups. The experimentation was conducted during the first term of the academic year 2018/2019.

The EFL Speaking Test

The speaking test (**Appendix**) was prepared to be used as a pre-post test. It has two main purposes. It was pre used to identify the actual level of the students concerning the EFL speaking skills before administering the program based on brain-based learning. As a post test, it was used to find out whether the intervention would influence the participants' speaking skills. The test consisted of three aspects of speaking (Accuracy, Pragmatic, and Fluency) which include nine questions. The first four questions were uses to assess the first aspect of speaking skills (Accuracy):

1- Pronouncing vowel/consonant correctly is reflected in question 1: pronounce the following pairs orally.

2- Producing correct stress pattern is reflected in question 2: Pronounce the following words showing stress.

3- Using appropriate vocabulary to convey meaning is reflected in question 3: Look at each picture and say what you can see

4- Using grammatical structure properly is reflected in question 4: Respond orally to the following dialogue

The second aspect (pragmatic) includes four questions in the light of the subskills which are expressing opinions with reasons, making a polite request, making a suggestion, and giving advice on how to stay healthy. All these pragmatic subskills are reflected in questions 5a, 5b, 5c, 5d: what would you say in the following situations. The last aspect is fluency which is reflected in question 6: Choose one of the following topics to talk about.

To measure the validity of speaking test content, it was submitted to group EFL specialists to evaluate the test as a whole in terms of content, number of questions, correctness and level of comprehension. The jury members approved the test questions, so the test proved to be valid.

The speaking test reliability was computed using the test -retest method. The test was administered to a group of 15 first year students excluded from the whole experiment-they were neither included in the experimental group nor in the control group. Then it was re-administered after two weeks to the same students. Formula of Cronbach's Alpha was used to calculate the reliability coefficient of the test. The

correlation coefficient between the two administrations was (0.841). This indicated that the test was proven reliable to be used for the purpose of the study.

Procedures

The following is a description of the steps the researcher went through for the experiment to achieve the purpose of the study which is investigating the effect of brain-based learning on developing EFL first year secondary school students' speaking skills. After getting the consent letter signed from the principal of Gamal Abdel-Nasser Secondary School for Girls, Zagazig, Egypt, the researcher selected two randomly intact classes in the same school and assigned them to two groups: experimental and control. Each group includes 25 student girls. After that, both groups were administered the pre speaking test. This administration was at the beginning of the first semester of the academic year 2018/2019.

The researcher selected a number of reported strategies and activities (Hileman, 2006; Tate, 2013) to be applied to the experimental group. Such strategies are Cooperative learning (Think -pair-share and Team-Pair-Solo), Brainstorming, Discussion, Graphic organizers (mind map and semantic map), role-paly, humor, authentic material (videos, reading aloud articles in international newspaper), and movement. The researcher also selected some pieces of soft music and English songs to create a relaxed environment, enrich students' emotions, reduce fear, and improve engagement and enhance speaking skills. In additions some short stories were selected carefully for reading aloud to develop their speaking skills. The application of the BBL was performed three sessions per week, over 7 weeks (October-November 2018). Each session was 90 minutes.

On the other hand, the control group received traditional instruction to speaking skills by their English teacher. Such method is prescribed in the Teacher's Guide of the Ministry of Education in Egypt which relies on the repetition without giving any attention to the interaction and the communication among the students. The researcher attended the English classes for the control group and recorded the steps through which the teacher goes to teach speaking skills -less attention was given to such skills and students didn't have any opportunities to practice oral activities in an interactive way; in addition, a lot of students are afraid of speaking or sharing in any oral task. After finishing the experimentation, the same EFL speaking test (as a post –test) was administered to both groups.
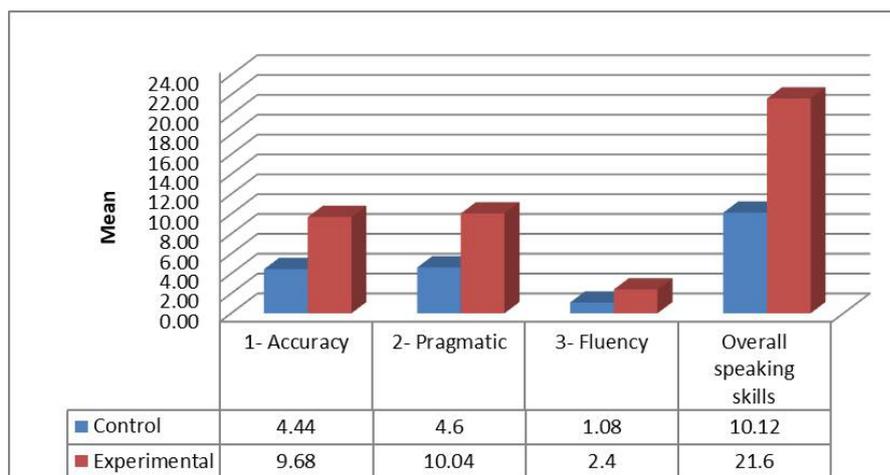
RESULTS

SPSS statistical techniques were used to analyze students' scores on both administrations (pre/post) for both groups. Test values for independent samples were used to test the difference between the mean scores of the experimental and the control groups. Test values for paired samples were also used to test the difference between the mean scores of the experimental group in the pre/post administration of the speaking test.

Independent samples t-test was used to validate the hypothesis that *there is a statistically significant difference between the mean scores of the experimental group and the control group in their performance of the post EFL speaking test in favor of the experimental group*. The results (**Table 2**, **Figure 1**) indicate that the experimental group surpassed the control group in the post administration of the EFL speaking test as a whole and its sub skills (accuracy, pragmatic, and fluency). Thus, the first hypothesis was accepted.

Table 2. Post *t*-test results of the control and the experimental groups (accuracy, pragmatic, fluency, and overall speaking skills)

Speaking sub-skills	Group	N	M	St. Deviation	D. f	t-value	sig
1-Accuracy	Control	25	4.44	2.002		9.525	0.000
	Experimental	25	9.68	1.887			
2-Pragmatic	Control	25	4.60	2.309		8.281	0.000
	Experimental	25	10.04	2.336	48		
3-Fluency	Control	25	1.08	.640		7.259	0.000
	Experimental	25	2.40	.645			
Overall speaking skills	**Control**	**25**	**10.12**	**4.371**		9.218	0.000
	Experimental	**25**	**21.60**	**4.435**			

Figure 1. The mean scores of the control and the experimental groups in the speaking sub-skills and overall speaking skills, in the post-test

Table 3. Post *t*-test results for the differences between Pre/post-test in speaking as a whole and its sub-skills of the experimental group

Speaking sub-skills	Group	N	M	St. Deviation	D. f	t-value	sig
1-Accuracy	Pre	25	3.28	1.514		11.361	0.000
	Post	25	9.68	1.887			
2-Pragmatic	Pre	25	3.84	2.055		19.606	0.000
	Post	25	10.04	2.336	48		
3-Fluency	Pre	25	.80	.500		13.856	0.000
	Post	25	2.40	.645			
Overall speaking skills	**Pre**	**25**	**7.92**	**3.341**		29.453	0.000
	Post	**25**	**21.60**	**4.435**			
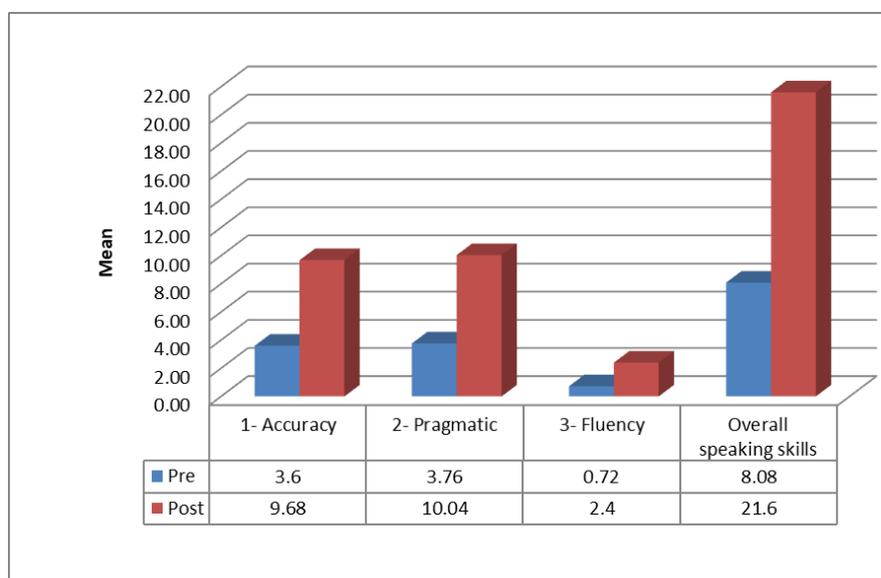
Figure 2. The mean scores of the treatment group in the speaking sub-skills and overall speaking skills, in the pre post-test

The second hypothesis to be tested is that *there is a statistically significant difference between the mean scores of the experimental group in their performance of the pre and post administrations of the EFL speaking test in favor of the post administration.* The results (**Table 3**, **Figure 2**) revealed that the experimental group did better in the post administration of the speaking test as a whole and its sub skills (accuracy, pragmatic, and fluency) than in the pre administration. Thus, the second hypothesis was accepted.

The third hypothesis stated that *"The program based on Brain-based learning would be effective in developing EFL secondary school student' speaking skills".*

In order to determine how much change the independent variable (the brain-based learning)had an effect on the students' speaking skills ,the effect size was calculated for each subskill and the overall skills. Eta squared equation was used to test the effect size. The effect size was then interpreted in the light of Cohen's d effect sizes (Cohen, 2013). **Table 4** presents the referential framework for identifying the effect size according to Cohen's formula.

Table 4. The referential framework for identifying the effect size for t-test value

Effect size	Interpretations
From 0.2 till less than 0.5	Small
From 0.5 till less than 0.8	Median
From 0.8 or more	Large
From 1.10 till less than 1.50	Very large
1.50 or more	Huge

Table 5. The effect size of the program in Developing the Overall speaking skills and Each Sub-skill

The skills	Test	N	M	St. Deviation	T	Eta square	Effect size
1-Accuracy	Pre	25	3.28	1.514	11.361	0.785	*1.91 huge*
	post	25	9.68	1.887			
2-Pragmatic	Pre	25	3.84	2.055	19.606	0.674	1.43 *Very large*
	post	25	10.04	2.336			
3-Fluency	Pre	25	.80	.500	13.856	0.667	1.41 *Very large*
	post	25	2.40	.645			
Overall speaking skills	Pre	25	7.92	3.341	29.453	0.760	1.77 *huge*

According to the results (**Table 5**) the adopted brain-based learning strategies and techniques had a positive effect on developing the experimental group students' overall speaking skills and each sub-skill. Therefore, this provides enough evidence to support hypothesis three.

DISCUSSION

This study found that the effect of the intervention on the speaking skills was statistically significant. The significant differences are due to exposing the experimental group to brain-based learning. The significant difference was at 0.01between the mean scores of the experimental group (taught through BBL) in the pre- and post-test in the overall speaking skills and in each sub-skill favoring the post test scores. Likewise, a significant difference at 0.01 was found between the mean scores of the experimental group and those of the control one in the post test in the overall speaking skills and in each subskill favoring the treatment group scores. These results indicated that the English speaking ability of the experimental group students was significantly increased at the 0.01 level after brain-based learning.

The students of the experimental group mastered the targeted accuracy skills: (pronouncing vowel/consonant correctly, producing correct stress pattern properly, using appropriate vocabulary to convey meaning, and using grammatical structure properly); and the pragmatic skills (expressing opinions with reasons, making a polite request, making a suggestion, giving advice on how to stay healthy); and finally the fluency skill (Speaking fluently without hesitation and undue pauses). Such improvement in speaking can be attributed to training to use some effective BBL strategies, activities during the three stages of speaking (pre speaking, during speaking, post-speaking). BBL Accelerates learning through enabling students' cognitive features, as well as enriching their positive emotions, interests, and reducing fear, stress and anxiety. As a result, the students feel more comfortable, passionate and participate freely in the speaking activities.

Cooperation or group-work opportunities were provided to enhance emotional awareness and relaxation. The students felt less stress when they worked in dyads or in groups cooperatively. The use of dyads (pairs) to work with their dialogues to complete grammatical structure and allowing students to walk around the classroom to discuss freely and brainstorm as Medina (2011) stated that our brains perform better when we are in motion. That kinesthetic aspect made them feel more relaxed.

Also, a brain-friendly environment was created via integrating strategies like mind-mapping, semantic mapping, listening to music, reading aloud short stories. All these strategies appealed to the participants' senses. As a result, students enjoyed the stress-free atmosphere provided to them while working with their tasks and welcomed the researcher teacher and classmates' input. When students were comfortable with their peers and their teacher, they were more receptive to learning, less hesitant to speak, and more engaged. Besides, the researcher was very careful about providing students with water and some healthy snacks like banana, apples as well fed students learn more than hungry ones (Bellisle, 2004).

Since the brain learns through experience, the researcher carefully selected dialogues related to personal situations they might have encountered in their daily life (going to a restaurant, how to keep healthy, a conversation between two friends expressing their opinions about the vacation in Sharm El-sheikh, and Mo. Salah as a great Egyptian footballer). That gave them the opportunity to practice vocabulary and grammar. Additionally, in accordance with Yagcioglu (2014), happy class hours would bring more success to classes. In this respect, the researcher asked students to tell jokes and listen to songs and music that provided them with positive energy.

In order to guarantee that all students would have the chance to learn best, instruction strategies that activate both hemispheres of the brain, e.g. mind mapping and discussion were adopted (Mento, Martinelli, & Jones, 1999). Furthermore, activities like role-play and real-life situations improved the pragmatic skills as these activities helped students to become more motivated and more effective in speaking classes. Also, utilizing some authentic materials like articles from some international newspapers or magazines and videos helped prepare learners for the real world of communication. They practice speaking English in a relatively realistic context. When the students were provided with a lot of input to enrich their repertoire in vocabulary, expressions and grammatical structures for acceptable language, they were able to communicate and interact accurately and fluently. The participants were completely happy, active and motivated during and after the application of BBL.

The results of the current study are in line with the previous research which assured the positive impact of applying the interactive instructional strategies of BBL on developing students' speaking skills (Duman, 2010; Farrell, 2016; Haghighi, 2013; Jampamoon, 2014; Köroğlu & Çakır, 2017; Koşar & Bedir, 2018; Oradee, 2012).

CONCLUSION AND IMPLICATIONS

In conclusion, the BBL instructional strategies utilized in this work improved Egyptian secondary school students' speaking skills namely accuracy, pragmatic and fluency. On the contrary, the control group students (taught through the traditional method prescribed in their teacher's guide) couldn't achieve a significant improvement like the experimental group students (taught through BBL). According to (Salem, 2017) ,the instruction methods adopted by the Ministry of Education in Egypt, produce mute students. Indeed, BBL has been globally applied in many countries such as USA, UK, Germany, Holland, Turkey and Finland (Connell, 2009). Such efficient approach facilitate and accelerate learning, thus it should be adopted in the Egyptian schools, not only to teach speaking, but other language skills as well. It was highlighted that creating a friendly caring and belonging classroom environment and the centeredness of the learner is deemed important.

In the light of results of the current study, it is very important for EFL teachers to change their roles in the speaking class to be of a *facilitator, a guide, a consultant, a creator* of a pleasant atmosphere to make the learners feel comfortable in order to participate and use the target language, *a helper* in organizing students' ideas and improving their oral performances to encourage students to participate actively. Second, *they should take care* of students' emotions during the learning process; give them more attention and appreciation. They are required to develop great willingness to appreciate students' efforts in their trials to speak the target language because it helps, and brings them a high level of self -esteem as well. Third, *they have to make students feel safe*, secured and supported during learning to overcome the reluctant factors for being able to take the risk to initiate speaking. Fourth, *they are to incorporate facts* of health such as stress management, nutrition, relaxation and exercise into the learning process**.** Moreover, *EFL Egyptian teachers need to be provided with* training to explore the effectiveness of brain-based learning in enriching the learning process to urge students to speak accurately, fluently and confidently. At last, *Curriculum designers should* make use of brain -based learning activities when designing English language courses to develop linguistic, affective, and psychomotor aspects of the learners.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Amal Hashem Khalil – Department of Curricula and Methodology, Faculty of Education. Zagazig University, Zagazig, Egypt.

Bahaa El-Din Elsayed El-Nagar – Department of Curricula and Methodology, Faculty of Education. Zagazig University, Zagazig, Egypt.

Michael Abd El-Mesih Awad – Department of Curricula and Methodology, Faculty of Education. Zagazig University, Zagazig, Egypt.

REFERENCES

Abdelmageed, M., & El-Naggar, Z. (2018, March). Digital storytelling enhances students' speaking skills at Zewail University of Science and Technology in Egypt. In *Society for Information Technology & Teacher Education International Conference* (pp. 278-287). Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/182537/

Abu-Hashem, H. T. (2011). *The Effeectiveness of a Training Program Designed in the Light of Brain-Based Learning Theory in Developing Listening and Pronunciation Teaching Skills of English Language Student Teachers*. Unpublished doctoral thesis, Women's college, Ain Shams University, Egypt.

Afshar, H. S., & Rahimi, M. (2014). The Relationship among Critical Thinking, Emotional Intelligence, and Speaking Abilities of Iranian EFL Learners. *Procedia - Social and Behavioral Sciences, 136*, 75-79. https://doi.org/10.1016/j.sbspro.2014.05.291

Ali Al-ma'shy, A. (2011). *Causes of EFL speaking weakness in Saudi secondary schools in Al-Gunfuthah City*. Unpublished master thesis, King Saud University, Kingdrom of Saudi Arabia.

Bellisle, F. (2004). Effects of diet on behaviour and cognition in children. *British Journal of Nutrition, 92*(S2), S227-S232. https://doi.org/10.1079/BJN20041171

Boyatzis, R. E., Goleman, D., & Rhee, K. (2000). Clustering competence in emotional intelligence: Insights from the Emotional Competence Inventory (ECI). *Handbook of emotional intelligence, 99*(6), 343-362. Retrieved from http://www.eiconsortium.org/pdf/eci_acticle.pdf

Brown, H. D. (2002). English language teaching in the "post-method" era: Toward better diagnosis, treatment, and assessment. *Methodology in language teaching: An anthology of current practice*, 9-18. https://doi.org/10.1017/CBO9780511667190.003

Bygate, M. (1987). *Speaking*: Oxford University Press.

Caine, G., & Caine, R. N. (2006). Meaningful learning and the executive functions of the brain. *The Neuroscience of Adult Learning: New Directions for Adult and Continuing Education, Number 110, 81*, 53. https://doi.org/10.1002/ace.219

Caine, R. N., Caine, G., McClintic, C., & Klimek, K. J. (2015). *12 Brain/Mind Learning Principles in Action: Teach for the Development of Higher-Order Thinking and Executive Function*: Corwin Press.

Cheng, X. (2000). Asian students' reticence revisited. *System, 28*(3), 435-446. https://doi.org/10.1016/S0346-251X(00)00015-4

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*: Routledge. https://doi.org/10.4324/9780203771587

Connell, J. D. (2009). The Global Aspects of Brain-Based Learning. *Educational Horizons, 88*(1), 28-39. Retrieved from https://files.eric.ed.gov/fulltext/EJ868336.pdf

Duman, B. (2006, July). The effect of brain-based instruction to improve on students' academic achievement in social studies instruction. In *9th International Conference on Engineering Education, San Juan, Puerto Rico*. Retrieved from http://icee.usm.edu/icee/conferences/icee2006/papers/3380.pdf

Duman, B. (2010). The effects of brain-based learning on the academic achievement of students with different learning styles. *Educational Sciences: Theory and Practice, 10*(4), 2077-2103. Retrieved from https://files.eric.ed.gov/fulltext/EJ919873.pdf

Eissa, H. M. S. (2019). Pedagogic effectiveness of digital storytelling in improving speaking skills of saudi efl learners. *Arab World English Journal (AWEJ), 10*(1), 127-138. https://doi.org/10.24093/awej/vol10no1.12

Erlauer, L. (2003). The brain-compatible classroom*: Using what we know about learning to improve teaching*: ASCD.

Etomy, N. E. B. A. (2015). The effectiveness of using innovative approaches in teaching speaking to libyan secondary school students. *Journal of Faculty of Education-Benha University, 352*(2914), 1-23. https://doi.org/10.12816/0022114

Farrell, T. S. (2016). Anniversary article: The practices of encouraging TESOL teachers to engage in reflective practice: An appraisal of recent research contributions. *Language Teaching Research, 20*(2), 223-247. https://doi.org/10.1177/1362168815617335

Ghany, S. Y. A., & Latif, M. M. A. (2012). English language preparation of tourism and hospitality undergraduates in Egypt: Does it meet their future workplace requirements? *Journal of Hospitality, Leisure, Sport & Tourism Education, 11*(2), 93-100. https://doi.org/10.1016/j.jhlste.2012.05.001

Haghighi, M. (2013). The effect of brain-based learning on iranian efl learners' achievement and retention. *Procedia-Social and Behavioral Sciences, 70*, 508-516. https://doi.org/10.1016/j.sbspro.2013.01.088

Hileman, S. (2006). Motivating students using brain-based teaching strategies. *Agricultural Education Magazine, 78*(4), 18. Retrieved from https://www.naae.org/profdevelopment/magazine/archive_issues/Volume78/v78i4.pdf#page=18

Humaera, I. (2015). Inhibition in Speaking Performance. *Langkawi: Journal of The Association for Arabic and English, 1*(1), 31-50. Retrieved from http://ejournal.iainkendari.ac.id/langkawi/article/view/379/364

Jackson, W. (2003). The effects of brain-compatible instruction on reading Achievement. *Dissertation Abstracts International, 64*(09). https://search.proquest.com/docview/855016993

Jampamoon, P. (2014). *The effects of using brain-based learning (BBL) activities on prathomsuksa 6 students' English speaking ability.* Srinakharinwirot University, Thailand. http://ir.swu.ac.th/xmlui/bitstream/handle/123456789/4140/Paiwan_J.pdf?sequence=1

Jensen, E. (2000). Brain-based learning: A reality check. *Educational leadership, 57*(7), 76-80.

Jensen, E. (2008). *Brain-based learning: The new paradigm of teaching*: Corwin Press.

Karimzadeh, P. (2017). The impact of drama-based instruction as effective language learning strategies on improving primary iranian esl learners' speaking abilities. *Bulletin de la Société Royale des Sciences de Liège, 86*, 908-918. https://doi.org/10.25518/0037-9565.6577

Köroğlu, Z., & Çakır, A. (2017). Implementation of flipped instruction in language classrooms: An alternative way to develop speaking skills of pre-service English language teachers. *International Journal of Education and Development using ICT, 13*(2). Retrieved from https://files.eric.ed.gov/fulltext/EJ1153321.pdf

Kosar, G., & Bedir, H. (2018). Improving Knowledge Retention via Establishing Brain-Based Learning Environment. *Online Submission, European Journal of Education Studie, 4*(9), 208-218. Retrieved from https://files.eric.ed.gov/fulltext/ED586917.pdf

Leong, L.-M., & Ahmadi, S. M. (2017). An analysis of factors influencing learners' English speaking skill. *International Journal of Research in English Education, 2*(1), 34-41. https://doi.org/10.18869/acadpub.ijree.2.1.34

Lombardi, J. (2008). Beyond learning styles: Brain-based research and English language learners. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 81*(5), 219-222. https://doi.org/10.3200/TCHS.81.5.219-222

Marope, P. T. M. (2016). Brain science, education, and learning: Making connections. *PROSPECTS, 46*(2), 187-190. https://doi.org/10.1007/s11125-017-9400-2

Mayer, R. E. (2017). How can brain research inform academic learning and instruction? *Educational Psychology Review, 29*(4), 835-846. https://doi.org/10.1007/s10648-016-9391-1

Mcnamee, M. M. (2011). The impact of brain-based instruction on reading achievement in a second grade classroom (Doctoral thesis, Walden University, College of Education, Minnesota). Available from ProOuest Thesiss and Theses database. (UMI No. 3443383) Retrieved from https://search.proquest.com/docview/855016993

Medina, J. (2011). Brain rules: 12 principles for surviving and thriving at work, home, and school. Retrieved on May 2, 2019 from http://videoplus.vo.llnwd.net/o23/digitalsuccess/SUCCESS%20Book%20Summaries/2011%20April%20SBS/Brain%20Rules%20Summary.pdf

Mento, A. J., Martinelli, P., & Jones, R. M. (1999). Mind mapping in executive education: applications and outcomes. *Journal of Management Development, 18*(4), 390-416. https://doi.org/10.1108/02621719910265577

Oradee, T. (2012). Developing speaking skills using three communicative activities (discussion, problem-solving, and role-playing). *International Journal of Social Science and Humanity, 2*(6), 533. https://doi.org/10.7763/ijssh.2012.v2.164

Pardede, P. (2011). Using short stories to teach language skills. *JET (Journal of English Teaching), 1*(1), 14-27. https://doi.org/10.33541/jet.v1i1.49

Pickering, S. J., & Howard-Jones, P. (2007). Educators' views on the role of neuroscience in education: Findings from a study of UK and international perspectives. *Mind, Brain, and Education, 1*(3), 109-113. https://doi.org/10.1111/j.1751-228X.2007.00011.x

Prigge, D. J. (2002). Promote brain-based teaching and learning. *Intervention in School and Clinic, 37*(4), 237-241. https://doi.org/10.1177/105345120203700408

Salem, A. A. M. S. (2017). Engaging ESP Students with Brain-Based Learning for Improved Listening Skills, Vocabulary Retention and Motivation. *English Language Teaching, 10*(12), 182-195. https://doi.org/10.5539/elt.v10n12p182

Sanaa, M. (2013). Developing the students'' speaking skill through communicative language teaching. Case study second year LMD students of English at Mohamed Kheider Biskra university,unpublished master thesis, Mohamed Kheider Biskra university, Algeria. Retrieved from http://dspace.univ-biskra.dz:8080/jspui/bitstream/123456789/4740/1/SE%20143.pdf

Sharma, L., & Sharma, A. (2013). Brain based instructional strategies for improving academic achievement and self-esteem. *Indian Journal of Health and Wellbeing, 4*(3), 562. Retrieved from https://search.proquest.com/docview/1795522670/fulltextPDF/BDE9CDCDB6DA45D5PQ/1?accountid=35474

Sousa, D. A. (2016). *How the brain learns*: Corwin Press.

Syahbandi, L. F. (2018). The effect of brain-based learning toward students'speaking skills. *Journal of Languages and Language Teaching, 5*(2), 52-56. https://doi.org/10.33394/jollt.v5i2.349

Tate, M. L. (2013). *Reading and language arts worksheets don't grow dendrites: 20 literacy strategies that engage the brain*: Corwin Press.

Torky, S. A. E. (2006). The effectiveness of a task-based instruction program in developing the english language speaking skills of secondary stage students. Unpublished master thesis, Ain Shams University, Egypt. Retrieved from https://files.eric.ed.gov/fulltext/ED523922.pdf

Widiati, U., & Cahyono, B. Y. (2006). The teaching of EFL speaking in the Indonesian context: The state of the art. *Bahasa dan seni, 34*(2), 269-292. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=2990091B19BCA296D4526755375A3461?doi=10.1.1.621.5648&rep=rep1&type=pdf

Willis, J. (2007). Review of research: Brain-based teaching strategies for improving students' memory, learning, and test-taking success. *Childhood Education, 83*(5), 310-315. https://doi.org/10.1080/00094056.2007.10522940

Willis, J. (2008). *Teaching the brain to read: Strategies for improving fluency, vocabulary, and comprehension*: ASCD.

Yagcioglu, O. (2014). The Advantages of Brain based Learning in ELT Classes. *Procedia - Social and Behavioral Sciences, 152*, 258-262. https://doi.org/10.1016/j.sbspro.2014.09.190

APPENDIX

The EFL Speaking Test (pre/post)

Name: Class: Duration: 30 minutes

1-Pronounce the following pairs orally

1- Heart-Hurt   2- Few-View   3-Chair-Share   4- Ridge- Rich   5- Think-Sink   6-pair-bear

2- Pronounce the following words showing stress

Transplant-graduate- organization-protect- industry – communication**.**

3-look at the pictures and say what you can see in each one.

4-Respond orally to the following dialogue.

Ali is meeting a tourist. His name is Jone.

Ali: Welcome to Egypt…………………?

Jone: I come from England.

Ali: Is this your first visit?

Jone: …………………………

Ali …………………………………..?

Jone: Because the weather here is fine, and the Egyptian people are friendly.

Ali: …………………………………...?

Jone: Two weeks. I intend to visit Luxor and Aswan.

Ali………………………..

Jone: Thank you

5-What would you say in the following situations:

a- Someone thinks that cars damage the environment. Express your opinion
b- You want to borrow your friend's phone to make a call.
c- You suggest spending the mid -year holiday in Sharm-El sheikh.
d- You advise your friend how to protect herself from infections.

6-Choose *one* of the following topics to talk about: -

1- Computers   2- Pollution   3- A famous scientist or a writer   4- an accident you saw last month

∞