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Original Research

The use of the *iBrainstorm* app in a collaborative argumentation-based learning context for developing listening comprehension skills by EFL learners

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The present study investigated the use of the iBrainstorm app in a collaborative argumentation-based learning context for developing listening comprehension skills by EFL learners. Two groups of students were formed. All of them studied English as a foreign language at the BA level at Bu-Ali Sina University, Iran. Participants were assigned to groups at random. Participants took a pre-test of listening comprehension skills before starting the programme. The control group listened to authentic audio tracks in English and discussed their contents, watched authentic English movies, discussed issues in the movies in pairs in the classroom. The experimental group spent part of the time on theoretical explanation of, and practical exercises with, argumentation-based learning by the iBrainstorm application. The total instruction time was the same for two groups, i.e., 32 hours. Students then took a post-test and, a month later, a delayed post-test in listening comprehension skills. The results show that the use of the iBrainstorm app significantly improved the students' listening comprehension skills, and significantly more so than those of the control group. These results have pedagogical implications for curriculum designers, material producers, and all who are involved in language study and pedagogy.

KEYWORDS: *listening comprehension skills, collaborative argumentation-based learning, English as a foreign language, curriculum design*

1. INTRODUCTION

Listening comprehension skills are active processes of meaning construction in message communication, in which the listener makes use of various sources of information to reconstruct the intended meaning of the oral message (Faerch & Kaspar, 1986; Yenkimaleki & van Heuven, 2016; Yenkimaleki et al., 2021). Vandergrift (2009) argues that, when listening, people draw on the following knowledge sources: linguistic knowledge, pragmatic knowledge, and prior experiential knowledge. Listeners consider the linguistic source to be the fundamental one. It is accessed through semantic, phonological, and syntactic knowledge of the target language, and permits the listener to assign meaning to the sound stream of the connected speech. Luu et al. (2021) concluded that prioritising prosody by using the techniques such as listening to low-pass filtered audio, repetition in synchrony with body movements, and shadowing, enhances listening comprehension skills.

Argumentation in this study is looked upon as a communicative activity of producing and exchanging reasons in the context of doubt or disagreement regarding topics students would listen to in the study to answer the questions or to discuss. Argumentation is a fundamental component of meaning making and decision taking in modern society. It can also be a vehicle for collaborative learning processes and knowledge co-construction in many learning tasks that entail complex matters and multiple perspectives, ranging from primary school to university and

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beyond (van Amelsvoort et al., 2007). This is known as Collaborative Argumentation-Based Learning (CABLE) (Moradimokhles & Hwang, 2020). With CABLE, students acquire and co-construct knowledge through discourse when they elaborate on their individual knowledge, sharing their knowledge and possibly developing new insights together as a team (Roberts et al., 2017). When students become better arguers (learning to argue) in groups, they improve their chances to collaboratively (co)construct knowledge (argue to learn). Rapid advancement of Technology-Enhanced Learning (TEL) environments and the swift growth of information, communication, and educational technology and tools offer ample opportunities to enhance students' argumentation competence (Noroozi et al., 2012).

Currently, the greatest challenge in teaching listening comprehension skills to EFL learners is to make training programmes convenient, practical, useful, and attractive to a broader cohort of students, to allow the learners to develop perception skills in the communication of the message (Yenkimaleki & van Heuven, 2016; Yenkimaleki & van Heuven, 2022). The *iBrainstorm* app in the collaborative argumentation-based learning context can meet this challenge. Therefore, the present study addresses the use of *iBrainstorm* app in the collaborative argumentation-based learning context in developing listening comprehension skills of Persian learners of English as a foreign language.

2. THEORETICAL BACKGROUND

2.1. Collaborative argumentation-based learning

Collaborative learning can be defined as a situation in which people work with each other towards achieving the same learning aim (Roberts et al., 2017). Collaborative learning differs from cooperative learning in several aspects. Generally, collaboration deals with joint and symmetrical engagement of people toward shared learning and problem-solving goals, while cooperation considers the division of work that learners typically work separately, performing a part of the tasks which later should be combined into a single product (Lehtinen et al., 1999; Moradimokhles & Hwang, 2020). Traditionally, collaborative learning is looked upon as engaging in interaction in small-group settings. However, in knowledge-building communities, collaboration often goes further, and beyond fixed small groups, since learners collaborate with different groups or like to have opportunistic collaborations with people in the community (Zhang et al., 2009; Angeli et al., 2017).

Noroozi et al. (2012) state that collaborative argumentation is a situation where some participants engage in an argumentative negotiation with the same aim of achieving a shared recognition of issues through multidimensional perspectives and negotiations for and against each other's point of view. Therefore, the goal is not to win a discussion or to simply turn others' perspectives (Noroozi et al., 2012). Collaborative argumentation could resolve complicated and controversial problems and might offer participants room for learning through discussions (Marttunen & Laurinen, 2002; Roberts et al., 2017). Van Amelsvoort et al. (2007) point out that a polished and extended discussion that includes different perspectives could deepen both recognition of the issue and collaborative learning.

Two perspectives are essential in collaborative argumentation. First, constructing multiple perspectives is required since approaching problems that do not have specific solutions demands discussion from different viewpoints (Van Amelsvoort et al., 2007; Roberts et al., 2017). Second, based on Hinds and Weisband (2003), a major aim of collaborative argumentation is shared understanding, i.e., collectively finding a procedure to organise and transfer the relevant information. Hinds and Weisband (2003) state that to create a shared understanding people must have the opportunity to learn with each other and develop mutual expectations, for instance, regarding task-related goals, processes, and information.

Collaborative interaction and argumentation avoid confrontation of different perspectives and support a shared recognition of the problems available (Quinn-Lee, 2014). When searching for the best solution for a problem with other parties, collaborative argumentation can help parties involved state and justify their perspectives on the issue. Some researchers criticised social work teaching methods (Proctor, 2007; Tew et al., 2012; Shu & Gu, 2018) in support of the passive transference of information instead of giving priority to active construction through discussions.

Researchers have pointed out that collaborative learning positively impacts the learning process (Remedios et al., 2008; Teasley, 2017). Some studies explain that collaboration requires both the individual's contribution to the group learning as well as the individual's learning from the group (Soller et al., 1998; Remedios et al., 2008). Furthermore, Soller et al. (1998) found that classroom learning improves significantly when students participate in learning activities with small groups of peers. Small group work activities may encourage students to ask questions, explain and justify their opinions, articulate their reasoning, and collaborate and reflect upon their knowledge, which motivates and enhances learning (Gokhale, 1995; Shu & Gu, 2018). This means the success of one student helps other students to be successful. Students who do not understand the material may scaffold with each other and share their knowledge with each other. Therefore, all the students are responsible for each other's learning as well as their own. This philosophy, practically, should also work in developing listening comprehension skills in EFL settings.

2.2. Listening comprehension skills

Listening comprehension skills are the complex processes that transform an auditory stimulus into a mental reconstruction on the part of the listener and the speaker's intention (Poelmans, 2003; Ismail & Aziz 2020; Yenkimaleki et al., 2021). Listening comprehension is a conscious process by which listeners, through using different types of cues from the context and their previous knowledge, construct meaning from the incoming input (O'Malley et al., 1989; Yenkimaleki & van Heuven, 2016;

Ismail & Aziz 2020). Listeners consciously process utterances in particular settings to perceive the message (Mendelsohn, 1994). Although listening comprehension is one of the important skills in second language (L2) acquisition, the teaching and learning of this skill have been seriously understudied (Keskin et al., 2019; McAndrews, 2020). Major psycholinguistic approaches to foreign language learning agree that a learner needs to be exposed to input. However, there is no agreement on the type of input needed and how such input is processed in order to be acquired (Karimvand, 2011; Nushi & Orouji, 2020). The main criteria which are taken into consideration when designing listening aids are contextual, personal, criterion of authenticity, sociolinguistic, the linguistic form of the speech signal, the instructional goal (Fedotova, 2015).

Listening in a foreign language is a complex task, which ranges from perception to comprehension and requires the interaction between top-down and bottom-up cognitive processes partly mediated by attention and memory mechanisms (Delvaux et al., 2015). Listening comprehension training programmes should include enough exercises aimed at training the students to listen at the level of the surface form of the linguistic unit, especially, at lower levels of language proficiency, i.e., there should be enough exercises helping to form bottom-up processing skills.

Studies investigating the role of topic familiarity in L2 listening comprehension have found a facilitative effect (Schmidt-Rinehart, 1994). Research in the 1980s concentrated on the impact of higher-level processes (top-down processes) on listening comprehension (Long, 1989, 1990). Attention was directed to the higher levels such as background knowledge, semantics, and syntax, and listeners were viewed as active participators in reconstructing the intended meaning of the message heard (Long, 1990; Schmidt-Rinehart, 1994; Yenkimaleki & van Heuven, 2020).

Anderson (2009) argued that listening comprehension is a complex process comprising internal processes like sound perception, word recognition, parsing, giving structure to the words and, consequently, interpretation which is giving meaning to the identified words. Goh (2000) studied the listening problems of Chinese students in Hong Kong through interviews and listening diaries. The results indicated that they had problems with connected speech, especially with blending and reduction. Considering the significance of perception of words Yenkimaleki (2016) stated that the impact of phonological modifications in connected speech can be so great that it may render the recognition of any word by L2 listeners impossible. Yenkimaleki (2016) added that the significance of lower-level phonological features has been underestimated to the extent that contextual clues will contribute to understanding of the listening material (Yenkimaleki, 2016; Carlson, 2019).

Bottom-up and top-down strategies arose out of 1970s computer science (Nunan, 2010, 2015). The bottom-up strategy is text based, relying upon language aspects (i.e., sounds) and is a process of decoding the sounds, from the smallest units to complete texts (i.e., listening for specific details, recognising cognates, and recognising word order patterns). Alternatively, the learner-based top-down strategy focuses upon the listener's thinking process, constructing the original meaning of the speaker by using incoming sounds, and using context as clues to interpret the main idea, make predictions, and summarise intentions (Nunan, 2010, 2015). The effects of background knowledge, for example, were investigated by Long (1990). Long (1990) used two listening passages, one on a topic considered familiar to the learners, the Rock group 2, and another believed to be unfamiliar, a gold rush in Ecuador, and tested the comprehension of 188 intermediate level Spanish learners. The learners, then, took a comprehension test and summarised their understanding of the passage in English. The comprehension test was in the form of a checklist. The study found that learners who used schemata outperformed those who depended on using a bottom-up approach. In fact, the comprehension of the former group was more accurate than that of the latter. Long concluded that schemata helped learners predict, anticipate, and infer the message heard, while the linguistic knowledge did not prove to be of great help (Long, 1990; Carlson, 2019). The role of semantic and syntactic alteration in the case of L2 listeners has been investigated (Field, 2005; Darti & Asmawati, 2017). Anderson (2009) concluded that L2 listeners paid more attention to syntactic information but less attention to semantic information in the input speech than native speakers did. This conclusion should be looked at with reservation because the criteria for the distinction between syntax and semantics were somewhat blurred. In another study, Chaudron (1995) checked the effect of syntactic modification of topic sentences in lectures and non-native speakers' recognition and recollection of those sentences. He found that subjects at a low level of proficiency benefited from the simplification of the topic, using synonyms and rhetorical questions.

Advance organisers facilitate listening tasks. They are introduced in the pre-listening phase and provide the listeners with all the prerequisite information. They help activate the background knowledge and set the expectations of the listeners. These organisers may be in the form of declarative and interrogative summarising sentences. Herron et al. (1998) tested the effectiveness of advance organisers in listening comprehension tasks. They used three groups, two experimental groups, and one control group. One group was provided with declarative sentences and the other one with interrogative sentences. The results in the listening phase showed the experimental groups outperformed the control group. Native and proficient non-native listeners make use of advance organisers much better than the beginning L2 listeners (Buck, 2004; Thai & Nguyen, 2018). Native listeners and proficient L2 listeners can process the input materials automatically, whereas beginning L2 listeners have restrictions in automatically processing of the input material because of their limited knowledge of the language.

Studies indicate that listeners at a low level of proficiency rely on top-down processing to compensate for their deficiency in the perception of speech. To document such a claim, Tsui and

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'Two perspectives are essential in collaborative argumentation. First, constructing multiple perspectives is required since approaching problems that do not have specific solutions demands discussion from different viewpoints. Second, based on Hinds and Weisband (2003), a major aim of collaborative argumentation is shared understanding, i.e., collectively finding a procedure to organise and transfer the relevant information'

Fullilove (1998) undertook a study by analysing the answers given by 2000 Chinese learners to listening comprehension questions. They separated the questions for which top-down processing might be helpful from the questions that could only be answered through bottom-up processing. The results indicated that even the answers to the mere bottom-up items were based on wrong top-down interpretation.

2.3. Message perception in listening comprehension

It has been proposed that we acquire language when we understand what we hear and what we read (Krashen, 2016). Krashen (2016) holds that the effectiveness of his so-called 'input hypothesis' is evidenced through method comparison studies. He adds that students in classes that supply comprehensible input outperform students who are exposed to less comprehensible input in communicative tests and do as well as, or better in grammar-based tests (Krashen, 2016). At the intermediate level, two kinds of studies supported this claim. Teaching language through the comprehensible presentation of the subject matter has proved more effective than the traditional teaching of subject matters at the intermediate level of instruction (Gut, 2007). In-school free reading programmes have also proven more effective than traditional approaches on a wide variety of tests for children (Ellis, 1997) and adults (Manson & Krashen, 1997; Basri et al., 2019).

Corder (1981) defines input as what goes into the mind for processing and not what is available for being taken in. Berne (2004) classifies input as the product when it is not yet processed and intake as the process when input is processed. He further redefines the intake as *'an abstract entity of learner language that has been fully or partially processed by the learners, and fully or partially assimilated into their developing system'* (Berne, 2004, p. 522). Input comprehensibility is affected, among other things, by individual factors, negotiation factors, environmental factors, and linguistic factors. Linguistic factors comprise linguistic complexity, token frequency of units (phonemes, words, etc.), and their perceptual saliency. Some researchers believe that perceptual saliency makes certain features of input more comprehensible. Perceptual saliency is one of the determining factors for the forms that are acquired (Yenkimaleki, 2018). The presence of reduced forms decreases perceptual saliency which, in turn, decreases the likelihood of input becoming intake (Friederici et al., 2000; Graham, 2017). Yenkimaleki and van Heuven (2018) pointed out that for the input to change to intake learners need to pay attention to the input. They further stated that noticing is affected by task demand, expectation and skill level, frequency of occurrence, and perceptual saliency.

Therefore, developing listening comprehension skills for EFL learners is of the utmost importance in message perception and communication of the messages (Yenkimaleki, 2017b). Technology-based application tools (TBAT) have become widely used in the foreign language teaching curriculum (Neri et al., 2008; Yavuz & Celik, 2017). Since there is no systematic study of the effect of collaborative argumentation-based learning through usage of the *iBrainstorm* app on developing listening comprehension skills for the EFL learners, we set up this experiment to experimentally investigate the effect of collaborative argumentation-based learning in developing the listening comprehension skills of Persian learners of English as a foreign language. The results may lead to modification of the EFL curriculum (e.g., Iran) in developing listening comprehension skills.

2.4. Current study

We proposed that the collaborative argumentation-based learning is a crucial element for the EFL programmes in enhancing listening comprehension skills of EFL learners (Yenkimaleki, 2017b, 2018). In the present experiment, we broaden our horizon and investigate the effect of using the *iBrainstorm* app in a collaborative argumentation-based learning context for developing the listening comprehension skills of Persian learners of English as a foreign language. The following research question was formulated: *Does the use of the iBrainstorm app in collaborative argumentation-based learning enhance EFL learners' listening comprehension skills?* At this stage we do not suggest any specific hypothesis as to the benefits yielded by the treatment in general. This will depend on the political and cultural views in different countries on the usage of technology in educational settings, and on the level of deployment of educational technology in these countries.

3. MATERIAL AND METHODS

3.1. Design of the study

To answer the research question we posed, we set up an experimental study in which we quantified the listening comprehension skills of our participants. Sixty participants who were chosen randomly out of 100 students recruited in the study in an extracurricular programme. Listening comprehension was tested within participants at three points in time, i.e., a pre-test immediately before the start of the treatment, a post-test immediately after the completion of the treatment, and a delayed post-test one month after the immediate post-test. Pre-test, post-test, and delayed post-test were (different) versions of the listening comprehension skills test from the standard Longman's TOEFL English proficiency test (paper-based version). One control group and one experimental group were utilised in this study. The independent variable in this study was the method of instruction, i.e., training listening comprehension

skills by *iBrainstorm* app and not employing it for the control group. The dependent variable was the listening comprehension score obtained by the students.

3.2. Participants

Study participants were industrial engineering students at the Bu-Ali Sina University, Iran. Sixty students were chosen randomly out of a larger group of 100. Participants were assigned at random to two groups, each including 30 students. The students' age range was between 18 and 20 years. The students' first language was Persian. None of the participants had ever lived in an English-speaking country by the time of the experiment. Participants took part in all training sessions in sixteen weeks, and two sessions per week (i.e., 32 hours in total).

3.3. Ethical issues

Ethical approval was obtained from the English department at Bu-Ali Sina University to enrol the participants in the experiment. All of the students agreed to take part in the programme (informed consent).

3.4. iBrainstorm app

iBrainstorm is a free iPad app that allows students and teachers to organise thoughts and ideas in creative ways. To help users skilfully organise their thoughts and ideas, *iBrainstorm* provides them with several types of diagrams to use. There are templates for various kinds of charts, webs, and diagrams. Also, *iBrainstorm* enables users to add in virtual post-it notes, just as students would use in class. Whatever students want to write on the post-it note, they type out. There is also a virtual pencil that lets students doodle or takes notes. Because *iBrainstorm* is highly customisable, it lets students be creative. The app permits students to connect to other iPads in the classroom so that students around the classroom can collaborate and directly build upon each other's ideas. *iBrainstorm* is easy to use as an organisational app for children and adults. The app looks like a corkboard with the ability to add coloured sticky notes and connect ideas using the coloured pencil option. Users can make daily schedules, homework or project boards, steps to a recipe, etc. Disabled students also can use *iBrainstorm* developmentally to track their daily routines. The teacher instructs the students to open the *iBrainstorm* app and find their tasks. Using this app helps reduce frustration and gives students a feeling of ownership and responsibility. The latest release of *iBrainstorm* enables students to capture and share their ideas, add sticky notes, drag and drop anywhere on the iPad screen, assign colours for prioritisation, draw on the background canvas and share with teachers or classmates with a simple gesture. What started out as an idea-sharing application quickly became the first-ever iPad-based, multi-device collaboration tool for the classroom.

iBrainstorm 5.0 has new features and an improved interface to serve students with high-quality digital education tools. New content and functions in the app will engage learners by gamifying aspects of the learning content. Animation, imagery, sound, illustration, and interactivity will all play a role in creating more engaging learning content for the students in developing listening comprehension skills in a collaborative argumentation-based learning context.

3.5. Materials

Authentic English materials (e.g., audios, videos), were used for the two groups and students discussed their contents in different sessions. Both pre-test, immediate, and delayed post-test were versions of the listening comprehension skills test taken from the standard Longman's TOEFL English proficiency test (paper-based version) (Phillips, 2003). We chose the TOEFL listening comprehension test because it is easy to administer, is standardised, has multiple versions calibrated to be equivalent. It comes in multiple-choice format (50 items with four alternatives each), for each equivalent version of the test. All versions of the test have been tuned to the same level of difficulty, as claimed by the documentation that goes with these tests. This makes the test ideal for a pre-test, immediate, and delayed post-test design. The pre-test and post-tests were different to rule out repetition effects.

3.6. Procedure

Before the beginning of the training programme, students took a pre-test of listening comprehension skills to ascertain whether the groups were homogeneous or not. Students listened to the 50 audio fragments and answered the multiple questions based on their contents.

After the students' listening comprehension skills were measured by the pre-test and we ensured that two groups were equal in their command of listening comprehension skills, the training programme started for the two groups. The control group received listening comprehension training by the instructor through the regular curriculum, which was through the Communicative Language Teaching method (CLT). CLT is based on the idea that learning language successfully comes through having to communicate real meaning. When learners are involved in real communication, their natural strategies for language acquisition will be used, and this will allow them to learn to use the language. According to CLT (Yenkimaleki, 2107a), the following variables must be emphasised: (i) communication (activities that involve real communication promote learning); (ii) tasks (activities in which language is used to carry out meaningful tasks support the learning process); and (iii) meaning (a language that is meaningful and authentic to the learner boosts learning).

CLT is a generally employed approach for teaching listening comprehension skills in EFL academic settings. The instruction was done at Bu-Ali Sina University. Authentic American English materials (e.g., audios, videos), were used for instruction purposes for control and experimental groups alike, and students discussed their contents in different sessions. Natural speech was presented to both groups and the students did not have control over the pace of the audio and video files.

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The experimental group received the same instructions in listening comprehension skills, but before doing listening comprehension tasks, students were divided into five groups and engaged in collaborative argumentation about the contents of the audio files with each other in five separate teams through the *iBrainstorm* application.

This software was novel for the students. The students in the experimental group were taught by the instructor how to use it. This was part of the treatment for the experimental group. The instructor brought up the subject of the files for the teams and students discussed it in English based on the content of the audio files before listening to the audio files employing the *iBrainstorm* application. Then they listened to the audio files and did the required tasks (e.g., answering some questions, talking about the content of the audio files). When the training programme ended, all the participants took an immediate post-test in listening comprehension skills, as well as a delayed post-test of listening comprehension skills four weeks after the immediate post-test was run.

Scoring was done objectively through the answer sheet since the tests were multiple choice questions with only one correct option per item. The range of the scores for the pre-test, immediate, and delayed post-test was between 0-50.

Table 1 illustrates the summary of the activities and the time spent (i.e., minutes) by two groups of participants in the study.

Table 1
Summary of activities and time spent (minutes) by two groups of participants in the experiment

ACTIVITY	GROUP	
	Control	Experimental
Listening to audio tracks/watching movies/discussing about their content	1280	640
Listening to the instructor explanations/guidance	640	640
iBrainstorm app		640
Total time spent	1920	1920

4. STUDY RESULTS

Figure 1 shows the means and 95% confidence intervals of the listening comprehension scores (between 0 and 50 items correct) obtained by the Experimental and Control groups in the pre-test, immediate post-test and delayed post-test (one month later). A t-test for independent groups bears out that there was no significant difference between the experimental (35.8) and control (35.7) groups in the pre-test scores, $t(58) = .2$ ($p = .845$). The experimental groups performed significantly better than the control group in the immediate post-test (40.0 vs 36.0, $t(58) = 4.9$, $p < .001$), as well as in the delayed post-test (39.3 vs 35.4, $t(58) = 4.3$, $p < .001$). The main effects of group and moment of testing, as well as the interaction between the factors, were tested by a Repeated Measures Analysis of Variance (RM-ANOVA) with Moment of testing as a within-participants factor and Group as a between-participants factor. The assumption of sphericity was met (Mauchly's $W = .959$, approximate $\chi^2(2) = 2.45$, $p = .299$) so that degrees of freedom did not have to be adjusted. The main effect of Group was significant, $F(1, 58) = 9.3$ ($p = .004$), as was the main effect of Moment of testing $F(2, 116) = 122.1$ ($p < .001$, $p\eta^2 = .678$). Post-hoc tests with Bonferroni correction for multiple comparisons indicate that the immediate and delayed post-test scores differ from the pre-test scores but not from each other ($\alpha = .05$). Crucially, the Group × Moment interaction is also significant, $F(2, 116) = 129.7$ ($p < .001$, $p\eta^2 = .691$). Separate one-way RM-ANOVAs per group then reveal that Moment of testing has only a small effect in the control group (35.8, 36.0, 35.4 for the three moments of testing), $F(2, 58) = 4.9$ ($p = .011$, $p\eta^2 = .144$). Only the difference between immediate and delayed post-test is significant in the post-hoc test, which suggests that the control students did not benefit by the treatment. For the experimental group, the effect of Moment is much larger (35.7, 40.0, 39.3), $F(2, 58) = 196.0$ ($p < .001$, $p\eta^2 = .871$). The post-hoc tests show that all three moments of testing differ from each other.

5. DISCUSSION

In the present study, the use of the *iBrainstorm app* in a collaborative argumentation-based learning context was investigated in developing listening comprehension skills by EFL learners. There were no differences between the two groups before the treatment started, as was shown by statistical analysis. After the treatment, the students' listening comprehension skills in the experimental group developed significantly while the control group did not improve their listening comprehension scores.

Following Andriessen and Baker (2015) and Chinn and Clark (2013), we argue that the main reason why the *iBrainstorm* app should enhance learning is that students will be involved in different types of tasks related to developing better recognition and understanding of content. By expressing their perspectives, students make their own perception of complex

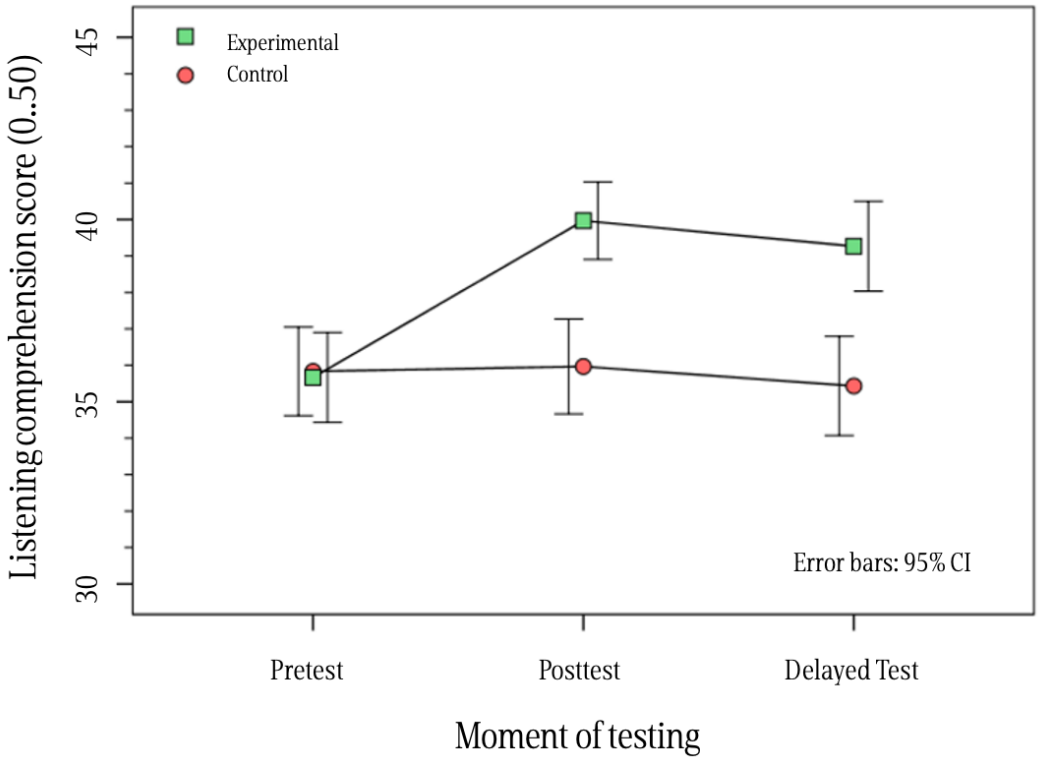

Figure 1. Listing comprehension score (0 .. 50) obtained at three moments of testing (pre-test, post-test, delayed post-test) by experimental and control groups (N = 30 per group). Error bars represent the 95% confidence interval of the mean

notions explicit and open to evaluation by their peers. In fact, research supports that the anticipation (Tetlock, 1992; Grant, 2019) and the real act of explaining one's own perspectives to other people (Webb et al., 1995; Grant, 2019) enhance students' learning. The oral utterance is addressed to other people, which may enhance reflection and consciousness of the incompleteness of one's own recognition (Keil, 2006; Lee & Cha, 2017), specifically when one is making an effort to convince people (Tetlock, 1992; Pulla, 2020). It is logical to suppose that when getting involved in argumentative explanations by using the *iBrainstorm* app, learners consciously find alternative perspectives and make an effort to resolve differences between divergent points of view through logical reasoning, thus resulting in learning outcomes. Miller et al. (2014) stated that predicting an argumentative explanation with a disagreeing student after studying a scientific article resulted in longer studying times and better learning outcomes, in comparison with not predicting any explanation or anticipating a positive discussion.

iBrainstorm is a collaborative tool that combines the functions of a whiteboard and a corkboard. Users can write or draw ideas and add sticky notes. It is great for interactive lessons and brainstorming sessions and allows creative and flexible teaching and learning methods. *iBrainstorm* (i) provides a user-friendly interface, (ii) supports real-time collaboration, (iii) can be used in various settings, from education to business, (iv) is portable, allowing for brainstorming on the go, and (v) is free to use.

The *SyncSpace* app provides an infinitely zoomable drawing space that can be shared in real-time across multiple devices. This tool is great for interactive classes, as it allows for real-time collaboration between teachers and students and between students themselves. However, compared with the *iBrainstorm* app, (i) the user interface feels less intuitive, (ii) the drawing tools are too basic for those who need more complex graphic tools, and (iii) drawings cannot be exported in vector format.

Coggle is an online tool for creating and sharing mind maps. It works simply by typing in text, automatically linking and arranging the map as you go. *Coggle* integrates with *Google Drive*, allowing for seamless storage and collaboration. This tool allows for creating colourful and engaging educational content and is useful for breaking down complex topics into simpler, more digestible chunks. Nevertheless, compared with the *iBrainstorm* app, (i) advanced features are available only in the paid version, (ii) the free version supports only three private diagrams, (iii) customisation options are limited compared to some other tools, and (iv) the automatic layout tends to create cluttered diagrams.

The findings of the study indicate that methodological issues in teaching listening comprehension skills matter. The results suggest that the use of the *iBrainstorm app* in a collaborative argumentation-based learning context can be employed for developing listening comprehension skills by EFL learners. These students appeared to concur with the idea that the use of the *iBrainstorm app* in a collaborative argumentation-based learning

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context enabled them to resolve complicated and controversial problems and offered participants room for learning through discussion (Roberts et al., 2017). Compared with normal classroom procedure, there were fewer distractions and less dependence on the instructor and yet with greater efficiency and effectiveness. According to Field (2005), practising listening in a whole-class context is ineffective. The more engagement students have in the tasks, the more chance learning can happen. The use of the *iBrainstorm app* in the collaborative argumentation-based learning context tasks gave the students a chance to reconstruct in their own ways what they could hear from their peers. They had a chance to actively structure their understanding as well as evaluate their work by comparing their perspectives with the others.

Students like to enhance critical thinking and thereby their argumentation skills by getting involved in learning environments that foster collaboration and mutual interaction (Wesp & Montgomery, 1998; Zheng & Chen, 2018). The argumentative process entails acts such as (i) raising an issue, discussing, explaining and categorising perspectives and ideas; (ii) gauging one's own perspectives and finding new information; (iii) changing one's ideas and attitudes on a given issue of discussion; and (iv) learning to find solutions to problems. There is also the probability that such ideas, knowledge and perspectives can be exchanged in a misinformed way and may sometimes lead to division of ideas and even conflict. This can be dependent on the instructor's interaction qualities, the aims of discussion within its settings, and the accessibility of information to the learners. To participate in argumentative negotiation, learners could be invited not only to build and transfer their own information (Bereiter & Scardamalia, 1989; Thai & Nguyen, 2018) but also to co-build and bring about new information structures with each other (Dillenbourg, 1999; Carlson, 2019).

The contribution of the present study to the growing body of literature on developing EFL listening comprehension skills is that we examined the use of the *iBrainstorm app* in collaborative argumentation-based learning to enhance these skills. We suggest that, when teaching listening comprehension skills, authentic tasks should be provided to the students, and that students should discuss the issues in small groups through *iBrainstorm* to make them reflect on the accuracy of their message perception.

6. CONCLUSION

The present study investigated the use of the *iBrainstorm app* in a collaborative argumentation-based learning context to develop listening comprehension skills by EFL learners. Overall, our results show that using the *iBrainstorm app* significantly improved the students' listening comprehension skills, and significantly more so than those of the control group. In the present study, the collaborative argumentation-based environment offered chances for the students to share and evaluate their knowledge and understanding, and to learn how to argue based on scientific information on different topics through *iBrainstorm*, prior to being engaged in specific listening comprehension tasks.

The study contributes to the recognition of the *iBrainstorm* app (and similar) in collaborative argumentation-based learning and its positive effect on the EFL students' listening comprehension skills. The limitation of this experiment was that we had access to sixty students as the participants of this study. Therefore, future studies may be conducted with larger number of participants, distributed over different countries, to verify the generalisability of the findings of this study.

It should be acknowledged that the present study has a number of limitations, which can only be overcome by replicating the experiment with added conditions. For instance, we did not have access to large number of participants in this study. Another study could be set with large number of participants with other language pairs to confirm the results of the study. Moreover, we argued that the involving the use of the *iBrainstorm* app is the single and crucial factor that explains the superior enhancement of listening comprehension in the experimental group.

We realise that the use of the *iBrainstorm* app prior to training listening comprehension, entails a variety of steps, each of which may help the students perform better in the subsequent listening tasks, and each of which should be tested separately in future studies. For instance, the app was used to discuss topics that would later be dealt with in the listening comprehension exercise. Discussing the topic beforehand activates relevant vocabulary (especially since the discussion is in the target language), students may alert one another of ways to express ideas on the topic (in the target language), and expose gaps in their knowledge of the topic, which may motivate them to listen more attentively in the subsequent listening exercise.. One way to decide whether it is the act of collaborative argumentation *per se*, or about argumentation on the same topic of the ensuing listening comprehension exercise would be to create an extra condition in which the topics do not match. However, if – as we expect – matching topics are a prerequisite, is it true that getting the students involved in collaborative argumentation in small groups through the app is more effective than collaboratively arguing under the guidance of a human moderator (i.e., the instructor) without breaking up into small groups.

And then again, one may ask whether collaborative argumentation is needed at all (contrary to what we argue), or would it be sufficient to simply inform the students beforehand about the topic of the listening comprehension exercise, either by just mentioning the topic, or by asking them to read an informative text (e.g., a Wikipedia entry, or a similar source of information) about it.

To sum up, using the *iBrainstorm* app to discuss a topic prior to getting our students involved in a listening comprehension task on the same topic, works well. Since the time spent on the prior activity is compensated by less time spent on the later exercise, it is time spent well. The pedagogical value of using the app therefore stands, but follow-up studies are required to determine what it is that makes its use so successful.

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References

Anderson, J. R. (2009). *Cognitive psychology and its implications* (7th ed.). Worth Publishers.

Andriessen, J. E., & Baker, M. J. (2015). Arguing to learn. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 439-460). Cambridge University Press. https://doi.org/10.1017/CBO9781139519526.027

Angeli, C., Howard, S. K., Ma, J., Yang, J., & Kirschner, P. A. (2017). Data mining in educational technology classroom research: Can it make a contribution? *Computers & Education, 113,* 226-242. https://dx.doi.org/10.1016/j.compedu.2017.05.021

Basri, H., Hashim, H., & Yunus, M. (2019). Using Google apps as learning strategy to enhance ESL writing. *Creative Education, 10,* 2649-2657. https://dx.doi.org/10.4236/ce.2019.1012192

Bereiter, C., & Scardamalia, M. (1989). Intentional learning as a goal of instruction. In L. B. Resnick (Ed.) *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 361-392). Lawrence Erlbaum Associates.

Berne, J. E. (2004). Listening comprehension strategies: A review of the literature. *Foreign Language Annals, 37*(4), 521-531. https://dx.doi.org/10.1111/j.1944-9720.2004.tb02419.x

Buck, G. (2004). *Assessing listening.* Cambridge University Press.

Carlson, G. (2019). Listening comprehension through culturally familiar contexts: A case study in Japan. *PASAA, 58,* 39-59.

Chaudron, C. (1995). Academic listening. In D. Mendelsohn & J. Rubin (Eds.), *A guide for the teaching of second language listening* (pp. 74-96). Dominie Press.

Chinn, C. A., & Clark, D. B. (2013). Learning through collaborative argumentation. In C. E. Hmelo-Silver, C. A. Chinn, C. K. K. Chan, & A. M. O'Donnell (Eds.), *The international handbook of collaborative learning* (pp. 314-332). Routledge. https://dx.doi.org/10.4324/9780203837290.CH18

Corder, S. P. (1981). *Error analysis and interlanguage.* Oxford University Press.

Darti, A., & Asmawati, A. (2017). Analyzing student's difficulties toward listening comprehension. *English, Teaching, Learning, and Research Journal*, 3(2), 211-228. https://dx.doi.org/10.24252/Eternal.V32.2017.A9

Delvaux, V., Huet, K., Calomme, M., Piccaluga, M., & Harmegnies, B. (2015, August 10-14). *Teaching listening in L2: A successful training method using the word spotting task.* In *Proceedings of the 18th International Congress of Phonetic Sciences* (pp. 784-788). The International Phonetic Association. https://internationalphoneticassociation.org/icphs-proceedings/ICPhS2015/Papers/ICPHS0784.pdf

Dillenbourg, P. (1999). *Collaborative learning: Cognitive and computational approaches.* Pergamon.

Ellis, R. (1997). *Second language acquisition*. Oxford University Press.

Faerch, C., & Kasper, G. (1986). The role of comprehension in second language learning. *Applied Linguistics, 7,* 257-274. https://dx.doi.org/10.1093/applin/7.3.257

Fedotova, N. L. (2015). *Methods of Russian as a second language teaching.* Zlatoust.

Field, J. (2005). Intelligibility and the listener: The role of lexical stress. *TESOL Quarterly, 39*(3), 399-423.

Friederici, A. D., Meryer, M., & Von Cramon, D. Y. (2000). Auditory language comprehension: An event-related MRI study on the processing of syntactic and lexical information. *Brain and Language, 77,* 289-300. https://dx.doi.org/10.1006/brln.2000.2313

Goh, C. (2000). A cognitive perspective on language learners' listening comprehension problems. *System, 28,* 55-75. https://doi.org/10.1016/S0346-251X(99)00060-3

Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education, 7*(1), 22-30. https://dx.doi.org/10.21061/jte.v7i1.a.2

Graham, S. (2017). Research into practice: Listening strategies in an instructed classroom setting. *Language Teaching, 50*(1), 107-119. https://dx.doi.org/10.1017/S0261444816000306

Grant, M. M. (2019). Difficulties in defining mobile learning: Analysis, design characteristics, and implications. *Educational Technology Research and Development, 67*(2), 361-388. https://doi.org/10.1007/s11423-018-09641-4

Gut, U. (2007). Learner corpora in second language prosody research and teaching. In J. Trouvain & U. Gut (Eds.), *Non-native prosody: Phonetic description and teaching practice* (pp. 145-167). Mouton de Gruyter.

Herron, C., Cole, S., York, H., & Linden, P. (1998). *A comparison study of student retention of foreign language video: Declarative versus interrogative advance*. Oxford University Press.

Hinds, P. J., & Weisband, S. P. (2003). Knowledge sharing and shared understanding in virtual teams. In C. B. Gibson & S. G. Cohen (Eds.), *Virtual teams that work: Creating conditions for virtual team effectiveness* (pp. 21-31). Wiley.

Ismail, N. S. C., & Aziz, A. A. (2020). The teaching of listening strategies in ESL classrooms. *International Journal of Academic Research in Business and Social Sciences, 10*(6), 197-209. https://dx.doi.org/10.6007/IJARBSS/v10-i6/7279

Karimvand, P. N. (2011). Psycholinguistic perspectives on comprehension in second language acquisition. *Journal of Language Teaching and Research, 2,* 1268-1273. https://dx.doi.org/10.4304/JLTR.2.6.1268-1273

Keil, F. C. (2006). Explanation and understanding. *Annual Review of Psychology, 57,* 227-254. https://dx.doi.org/10.1146/ANNUREV.PSYCH.57.102904.190100

Keskin, H. K., Ari, G., & Baştuğ, M. (2019). Role of prosodic reading in listening comprehension. *International Journal of Education and Literacy Studies, 7*(1), 59-65. https://dx.doi.org/10.7575/aiac.ijels.v.7n.3p.59

Krashen, S. (2016). The availability of conscious knowledge: A Comment on Lindseth (2016). *Foreign Language Annals, 49*(3), 635-636. https://dx.doi.org/10.1111/flan.12207

Lee, Y. J., & Cha, K. W. (2017). Listening logs for extensive listening in a self-regulated environment. *The Asia-Pacific Education Researcher, 26*(5), 271-279. https://dx.dx.doi.org/10.1007/s40299-017-0347-0

Lehtinen, E., Hakkarainen, K., Lipponen, L., Rahikainen, M., & Muukkonen, H. (1999). *Computer-supported collaborative learning: A review.* University of Nijmegen Press.

Volume 8 Issue 1, 2024, pp. 9–19 doi: 10.22363/2521-442X-2024-8-1-9-19

Long, D. R. (1989). Second language listening comprehension: A schema-theoretic perspective. *Modern Language Journal*, *73,* 32-40. https://dx.doi.org/10.1111/J.1540-4781.1989.TB05307.X

Long, D. R. (1990). What you don't know can't help you: An exploratory study of background knowledge and second language listening comprehension. *Studies in Second Language Acquisition, 12*(1), 65-80. https://dx.doi.org/10.1017/S0272263100008743

Luu, V. T. M., Lian, A.-P., & Siriyothin, P. (2021). Developing EFL learners' listening comprehension through a computer-assisted self-regulated prosody-based listening platform. *CALL-Electronic Journal, 22*(1), 246-263. https://callej.org/index.php/journal/article/view/330

Manson, B., & Krashen, S. (1997). Extensive reading in English as a foreign language. *System, 25,* 91-102. https://doi.org/10.1016/S0346-251X(96)00063-2

Marttunen, M., & Laurinen, L. (2002). Quality of students' argumentation by e-mail. *Learning Environments Research, 5*(1), 99-123. https://dx.doi.org/10.1023/A:1015666724692

McAndrews, M. (2020). *Prosody instruction for ESL listening comprehension*. ProQuest Dissertations Publishing.

Mendelsohn, D. J. (1994). *Learning to listen: A strategy-based approach for the second language learner*. Dominie Press.

Miller, B. W., Anderson, R. C., Morris, J., Lin, T. J., Jadallah, M., & Sun, J. (2014). The effects of reading to prepare for an argumentative discussion on cognitive engagement and conceptual growth. *Learning and Instruction, 33*, 67-80. https://doi.org/10.1016/j.learninstruc.2014.04.003

Moradimokhles, H., & Hwang, G. J. (2020). The effect of online *vs.* blended learning in developing English language skills by nursing students: An experimental study. *Interactive Learning Environments, 30*(9), 1653-1662. https://dx.doi.org/10.1080/10494820.2020.1739079

Neri, A., Mich, O., Gerosa, M., & Giuliani, D. (2008). The effectiveness of computer assisted pronunciation training for foreign language learning by children. *Computer Assisted Language Learning, 21,* 393-408. https://dx.doi.org/10.1080/09588220802447651

Noroozi, O., Weinberger, A., Biemans, H. J. A., Mulder, M., & Chizari, M. (2012). Argumentation-based computer supported collaborative learning (ABCSCL): A synthesis of 15 years of research. *Educational Research Review, 7*(2), 79-106. https://dx.doi.org/10.1016/j.edurev.2011.11.006

Nunan, D. (2010). *Teaching English to young learners.* Anaheim University Press.

Nunan, D. (2015). *Teaching English to speakers of other languages: An introduction*. Routledge. https://dx.doi.org/10.4324/9781315740553

Nushi, M., & Orouji, F. (2020). Investigating EFL teachers' views on listening difficulties among their learners: The case of Iranian context. *SAGE Open, 10*(2). https://dx.doi.org/10.1177/2158244020917393

O'Malley, J. M., Chamot, A. U., & Küpper, L. (1989). Listening comprehension strategies in second language acquisition. *Applied Linguistics, 10*(4), 418-437. https://dx.doi.org/10.1093/applin/10.4.418

Phillips, D. (2003). *Longman preparation course for the TOEFL test: The paper test, with answer key.* Pearson.

Poelmans, P. (2003). *Developing second-language listening comprehension: Effects of training lower-order skills versus higher-order strategy*. LOT Publications: Netherlands Graduate School of Linguistics. https://www.lotpublications.nl/Documents/076_fulltext.pdf

Proctor, E. K. (2007). Implementing evidence-based practice in social work education: Principles, strategies, and partnerships. *Research on Social Work Practice, 17*(5), 583-592. https://doi.org/10.1177/1049731507301523

Pulla, S. (2020). Mobile learning and indigenous education in Canada: A synthesis of new ways of learning. In *Indigenous studies: Breakthroughs in research and practice* (pp. 175-199). IGI Global. https://doi.org/10.4018/978-1-7998-0423-9.ch010

Quinn-Lee, L. (2014). School social work with grieving children. *Children & Schools, 36*(2), 93-103. https://dx.doi.org/10.1093/cs/cdu005

Remedios, L., Clarke, D., & Hawthorne, L. (2008). The silent participant in small group collaborative learning contexts. *Active Learning in Higher Education, 9*(3), 201-216. https://doi.org/10.1177/1469787408095846

Roberts, L. D., Howell, J. A., & Seaman, K. (2017). Give me a customizable dashboard: Personalized learning analytics dashboards in higher education. *Technology, Knowledge and Learning, 22*(3), 317-333. https://dx.doi.org/10.1007/s10758-017-9316-1

Schmidt-Rinehart, B. C. (1994). The effects of topic familiarity on second language listening comprehension. *The Modern Language Journal, 78,* 179-188. https://dx.doi.org/10.1111/J.1540-4781.1994.TB02030.X

Shu, H., & Gu, X. (2018). Determining the differences between online and face-to-face student-group interactions in a blended learning course. *The Internet and Higher Education, 39,* 13-21. https://dx.doi.org/10.1016/j.iheduc.2018.05.003

Soller, A., Goodman, B., Linton, F., & Gaimari, R. (1998, August). Promoting effective peer interaction in an intelligent collaborative learning system. In B. P. Goettl, H. M. Halff, C. L. Redfield, & V. J. Shute (Eds.), *Intelligent tutoring systems: Lecture notes in computer science* (pp. 186-195). Springer. https://dx.doi.org/10.1007/3-540-68716-5_24

Teasley, S. D. (2017). Student facing dashboards: One size fits all? *Technology, Knowledge and Learning, 22*(3), 377-384. https://doi.org/10.1007/s10758-017-9314-3

Tetlock, P. E. (1992). The impact of accountability on judgment and choice: Toward a social contingency model. *Advances in Experimental Social Psychology, 25,* 331-376. https://dx.doi.org/10.1016/S0065-2601(08)60287-7

Tew, J., Holley, T., & Caplen, P. (2012). Dialogue and challenge: Involving service users and carers in small group learning with social work and nursing students. *Social Work Education, 31*(3), 316-330. https://dx.doi.org/10.1080/02615479.2011.557429

Thai, C. D., & Nguyen, N. Q. (2018). Listening comprehension: First year English-major students' perceptions and problems. *CTU Journal of Innovation and Sustainable Development, 54*(2), 75-83. https://dx.doi.org/10.22144/ctu.jen.2018.010

Tsui, A. B. M., & Fullilove, J. (1998). Bottom-up or top-down processing as a discriminator of L2 listening performance. *Applied Linguistics, 19*(4), 432-451. https://dx.doi.org/10.1093/applin/19.4.432

Van Amelsvoort, M., Andriessen, J., & Kanselaar, G. (2007). Representational tools in computer supported collaborative argumentation-based learning: How dyads work with constructed and inspected argumentative diagrams. *The Journal of the Learning Sciences, 16*(4), 485-521. https://dx.doi.org/10.1080/10508400701524785

Vandergrift, L. (2009). *Listening: Theory and practice in modern foreign language competence*. LLAS Publishing.

Webb, N. M., Troper, J. D., & Fall, R. (1995). Constructive activity and learning in collaborative small groups. *Journal of Educational Psychology, 87,* 406-423. https://dx.doi.org/10.1037/0022-0663.87.3.406

Wesp, R., & Montgomery, K. (1998) Developing critical thinking through the study of paranormal phenomena. *Teaching of Psychology, 25*(4), 275-278. https://dx.doi.org/10.1080/00986289809709714

Yavuz, F., & Celik, O. (2017). The importance of listening in communication. *Global Journal of Psychology Research: New Trends and Issues, 7*(1), 8-11. https://dx.doi.org/10.18844/gjpr.v7i1.2431

Yenkimaleki, M. (2016). Why prosody awareness training is necessary for training future interpreters. *Journal of Education and Human Development, 5,* 256-261. https://dx.doi.org/10.15640/jehd.v5n1a26

Yenkimaleki, M. (2017a). *Effect of prosody awareness training on the quality of consecutive interpreting between English and Farsi*. LOT Publishing.

Yenkimaleki, M. (2017b). Developing listening comprehension skills by interpreter trainees through prosody teaching: Does methodology make a difference? *PEOPLE: International Journal of Social Sciences, 3,* 26-42. https://doi.org/10.20319/pijss.2017.32.2642

Yenkimaleki, M. (2018). Implicit vs. explicit prosody teaching in developing listening comprehension skills by interpreter trainees: An experimental study. *International Journal of English Language and Linguistics Research, 6*(1), 11-21.

Yenkimaleki, M., & van Heuven, V. J. (2018). The effect of teaching prosody teaching on interpreting performance: An experimental study of consecutive interpreting from English into Farsi. *Perspectives: Studies in Translatology, 26*(1), 84-99. https://dx.doi.org/10.1080/0907676X.2017.1315824

Yenkimaleki, M., & van Heuven, V. J. (2016). Effect of explicit teaching of prosodic features on the development of listening comprehension by Farsi-English interpreter trainees: An experimental study. *International Journal of English language Teaching, 4,* 32-41. https://eajournals.org/ijelt/vol-4-issue-6-july-2016/effect-explicit-teaching-prosodic-features-development-listening-comprehension-farsi-english-interpreter-trainees-experimental-study

Yenkimaleki, M., & van Heuven, V. J. (2020). Relative contribution of explicit teaching of segmentals vs. prosody to the quality of consecutive interpreting by Farsi-to-English interpreting trainees. *Interactive Learning Environments, 31*(1), 451-467. https://dx.doi.org/10.1080/10494820.2020.1789673

Yenkimaleki, M., & van Heuven, V. J. (2022). Comparing the nativeness vs. intelligibility approach in prosody instruction for developing speaking skills by interpreter trainees: An experimental study. *Speech Communication, 137,* 92-102. https://dx.doi.org/10.1016/j.specom.2022.01.007

Yenkimaleki, M., van Heuven, V. J., & Moradimokhes, H. (2021). The effect of prosody instruction in developing listening comprehension skills by interpreter trainees: Does methodology matter? *Computer Assisted Language Learning, 36*(5-6), 968-1004. http://doi.org/10.1080/09588221.2021.1957942

Zhang, J., Scardamalia, M., Reeve, R., & Messina, R. (2009). Designs for collective cognitive responsibility in knowledge-building communities. *The Journal of the Leaning Sciences, 18*(1), 7-44. https://dx.doi.org/10.1080/10508400802581676

Zheng, L., Li, X., & Chen, F. (2018). Effects of a mobile self-regulated learning approach on students' learning achievements and self-regulated learning skills. *Innovations in Education and Teaching International, 55*(6), 616-624.

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