IMPACT OF CRITICAL THINKING INSTRUCTION THROUGH FLIPPED TEACHING ON IRANIAN EFL LEARNERS' LISTENING COMPREHENSION

Dr. Sara SHAHANI

ORCID: 0000-0003-4569-3130
Department of English, Isfahan (Khorasgan) Branch
Islamic Azad University
Isfahan, IRAN

Dr. Azizeh CHALAK

ORCID: 0000-0002-6701-8366
Department of English, Isfahan (Khorasgan) Branch
Islamic Azad University
Isfahan, IRAN

Dr. Hossein Heidari TABRIZI

ORCID: 0000-0002-9360-1555
Department of English, Isfahan (Khorasgan) Branch
Islamic Azad University
Isfahan, IRAN

ABSTRACT

The present study investigated the effects of critical thinking instructions through a flipped teaching method on English Language learners' listening comprehension. The sample consisted of 80 Iranian intermediate English language learners that were divided into two experimental and two control groups. The two experimental groups that experienced flipped classrooms were given listening materials before the start of the class. Then cooperative learning took place in a face-to-face learning environment. The two control groups were taught in conventional language classrooms. Besides, one class from each group received instructions during the treatment phase on critical thinking. The International English Language Testing System (IELTS) was used to collect listening comprehension data on pretest and posttest. The Statistical Package for Social Sciences version 25 was used to run statistical analysis and t-tests on the data. The results of the study revealed that the flipped approach was more effective when language learners were given instructions on critical thinking. Language teachers can benefit from critical thinking instruction in flipped teaching to enhance the learners' listening comprehension ability by activating higher-order mental capacities such as critical thinking.

INTRODUCTION

Learning English is important as it is the most commonly spoken language. People all over the world study it in numerous different language learning settings. In most of these settings, learners play no or little role in the listening practices that are given. Listening has been considered a crucial skill to accelerate the development of language proficiency (Nunan, 2002).

Despite the many attempts that have been made to train language learners to become successful in the process of language learning, many EFL learners still struggle with listening comprehension (Ahmad, 2016). Listening is one of the most challenging skills for EFL learners due to the complexity of its process and the different types of knowledge needed for successful listening (Graham & Macaro, 2008). The learners' difficulties in listening comprehension can be attributed to the factors like the difficult nature of listening (Gonen, 2009), the speed of delivery of texts and the speaker`s accent (Graham, 2006) as well as underestimating the vital role of this skill in language classrooms (Brownell, 2013). In Iranian educational settings, several studies have demonstrated the existence of learners' difficulties in listening comprehension (Manzuri, Shahraki, & Fatemi, 2016; Nowrouzi, Sim Tam, Zareian, & Nimehchisalem, 2015), this calls for an effective teaching methodology to help learners develop their listening comprehension.

In traditional classrooms, learners sit passively in the classroom and listen to their teachers. The problem is that the learners are so passive, and they are not actively engaged in the process of listening exercises due to their problems in listening comprehension. It seems that using technology or, in other words, a different way of methodology helps learners improve their listening comprehension. Raths (2014) points out that the accessibility of online content and advances in technology challenge the traditional notion of teaching and learning. Datig and Ruswick (2013) believe that the traditional lecture is becoming an old-fashioned style of teaching. Today most learners have easy access to the internet and they prefer to learn in a more active and collaborative environment (Vaughan, 2014).

In addition to an effective teaching methodology, developing learners' autonomy through creating a student-centred learning environment is one of the most important goals in education through which learners' critical thinking ability is promoted as well (Brown, Afflerbach, & Croninger, 2014). In this regard, critical thinking is highly emphasized in the current educational trend and different teaching techniques and methods (Paul, 2012; Tyson, 2015). Group activities, the use of conceptual diagrams, as well as reasoning and inferring, are suggested for the development of critical thinking (Marijic, 2016; Peralta, 2017).

The continuous access to technological devices and the world of the internet causes language learners' needs to no longer be met through course books. Likewise, Collins and Halverson (2009) believe that today's language learners are less patient with teachers` lectures. Similarly, it has been stated that the time for genuine educational reforms is now available through the widespread use of technology in many language classrooms across the world (Ahmadi, 2018). The introduction of the flipped teaching method and digital technologies has the potential to encourage and promote active learning, learner-centeredness, and critical thinking skills of language learners in EFL classrooms (Alsulami, 2016; Kong, 2014). Flipped teaching moves lectures outside the classroom and provides more interaction, engagement, participation, feedback, and different types of learning activities inside the classroom, which can help practicing listening comprehension. The flipped teaching model has the potential to address the problems of listening and the lack of critical thinking abilities by focusing on student-centred learning and by integrating technology in the classroom to support a hybrid or blended learning design (Boucher, Robertson, Wainner, & Sanders, 2013).

Iranian EFL situations in which language learners are not sufficiently exposed to the target language may lead to the learners' poor achievement of the English language. The flipped teaching method can help language learners have access to the target language outside of the classroom by watching educational videos that are created by their teachers or from other widely used sources such as YouTube. They will have access to material through PowerPoint slides that have been chosen and prepared by their teachers, listen to audios files or review papers related to the course that is being taught. Teachers can also benefit from in-class time to enhance students' thinking, encourage collaborative learning, and to provide different student-centred activities. Problems facing listening comprehension and lack of attention to critical thinking abilities in the Iranian EFL context have been inspiring enough for EFL researchers to investigate the impact of the flipped teaching method on listening comprehension and to examine the impact of critical thinking instructions in this setting in comparison to traditional teaching methods.

LITERATURE REVIEW

Flipped Teaching: Background and Contributions in ELT Research

A flipped classroom is an instructional strategy that reverses the traditional class. According to Pink (2010), the modern use of online videos, followed by face-to-face teaching, is often attributed to Jonathan Bergmann and Aaron Sams. The idea occurred to them when they were struggling to re-teach lessons to absent individuals (Fulton, 2012). They found that learners who had difficulties with certain homework concepts could not accomplish subsequent homework problems until they received help the next day in the classroom (Bull, Ferster, & Kjellstorm, 2012). The two teachers combined video demonstrations and real-time explanations, then put them on the internet. Their videos were highly welcomed by both learners who had missed the classes and those who needed to review the lessons. Since then, there has been growing interest in the flipped teaching method articles, and the press appears on this method almost daily.

The development of flipped pedagogy can be linked back to the shift from teacher-centred to learner-centred instructions (Hutchings & Quinney, 2015; Musallam, 2010). In a flipped classroom, teachers use different activity-based elements to create engaging and student-centred environments (Fink, 2003). This model provides learners with more control over their learning and provides them with the opportunity to take responsibility for their learning (Baker, 2000). The flipped classroom moves the students away from a teacher-centred learning setting to another environment where instructors are facilitators and organizers so that students come to class with a piece of basic knowledge about the content,, they can engage in interactive learning during class time (William & Wuensch, 2016). According to Brown (2012), this can be regarded as an adjustment period, because some students have relied so heavily on their teachers.

As to the teachers' role in a flipped classroom, the flipped classroom offers a role change for the teacher from a 'sage on the stage' to a 'guide on the side', which is a fundamental element of flipped approach (Baker, 2000). In flipped education, teachers transmit new knowledge before class time to guide learners through different active learning tasks (Hao, 2016; Morrison, 2014). As Bergmann and Sams (2012) state, teachers do not have to lecture for long hours while students passively listen and take notes. Thus, they can work with students more intensively, providing them with practical support, guiding them through the lessons, helping them apply what they have learned online previously, encouraging them to take part in collaborative activities and to think critically.

Concerning the learners' role, according to Van Veen (2013), students are active individuals who reconstruct knowledge from received information. Although teachers deliver the instructional content, the focus is on engaging and doing things with that knowledge instead of sitting passively and listening to someone else's presentation (Ouda & Ahmed, 2016). Berrett (2012) asserts that learners gather the knowledge outside of class, and then they apply what they have learned to new contexts during class. In the inverted classroom, students are provided with additional time to solve problems while having the teacher there as a guide. Therefore, teachers should remember that the most crucial element of the flipped classroom is to focus on the learners (Bergmann & Sams, 2012). Bergmann and Sams also stated that the flipped classroom is an environment where students are active learners. They take ownership of the content and use their knowledge to guide one another without the teacher's prompting; therefore, it is a constructivist environment. Students collaborate and discuss different content depending on their diverse interests and needs. Moreover, learners can ask exploratory questions and investigate beyond what is taught during the classroom. In this setting, peer instruction and cooperative learning are formed spontaneously.

Regarding the flipped teaching method and listening comprehension on which the current study focuses, Zeng (2016) states that there are some attributes of flipped classrooms that are in alignment with the requirements of English listening. First of all, in traditional settings, learners do the listening exercises in class and struggle to get the right answer. However, it is widely acknowledged that learners need opportunities to learn autonomously at their own pace. Secondly, a flipped classroom setting allows for the repeated use of listening materials. Learners have more time to do the listening practice, and they are exposed to a variety of materials. Thirdly, the pre-recording of materials in flipped education can help students with different competence levels. In a traditional classroom, all learners listen to the same materials at the same time, while individual differences are neglected.

Empirical Research on Flipped Teaching

Flipped teaching has been the focus of attention by second or foreign language scholars. Berrett (2012) compared the flipping model with the traditional lecture. The evidence shows that the flipped teaching-teaching model can be applied in EFL contexts to increase the interaction between teachers and students, to develop students' responsibility, to increase motivation for learning, and to enhance self-reliance.

Zainuddin and Halili (2016) investigated a variety of research and trends in flipped teaching. They concluded that the flipped learning model is used in many fields and it has positive impacts on different aspects of students' learning, including interaction, motivation, engagement, as well as their achievement. Another study conducted by Şengel (2016) proved that learners' progress in the form of homework performance, and the amount of time spent on work before class was significantly higher in the flipped classroom compared to the traditional classroom-basedd learning setting.

Several research studies examined the impacts of the flipped classroom on learners' English language skills, including listening skill (Ahmad, 2016), writing skills (Yu & Wang, 2016), and grammar (Al-Harbi & Alshumaimeiri, 2016). Soliman (2016) examined the impact of flipped teaching on English for Academic Purposes (EAP) teaching. They observed the efficiency of the flipped teaching method in the EAP class. In another study, Al-Harbi and Alshumaimeri (2016) explored the possible effects of the flipped classroom in teaching English grammar on secondary school students' performance. The results indicated that flipped teaching could enhance learners' grammar performance; besides, students had a positive attitude toward using the flipped strategy. A research conducted by Alsowat (2016) looked into the impact of an EFL flipped teaching model on students' higher-order thinking skills, engagement, and satisfaction. The results revealed the positive effects of using flipped classrooms in acquiring those skills.

One of the features of the flipped classroom that can justify its effectiveness in improving listening comprehension skills is the active learning feature. Literature proved that the use of videos improved listening comprehension skill (Sarani, Behtash, & Arani, 2014; Wagner, 2010). The study conducted by Ahmad (2016) aimed at examining the effectiveness of the flipped teaching method on EFL learners' listening comprehension. Thirty-four 3rd-year EFL students were involved in this study. The result indicated that the flipped classroom could significantly affect the students' listening comprehension.

Samah and Saka (2016) also examined the effectiveness of the flipped classroom model on EFL learners' listening comprehension. Twenty-five university students were involved in this study as an experimental group who participated in the pre/post-listening comprehension test. After the administration of the pre-test, students were taught listening through the flipped teaching technique. The statistical analysis indicated an improvement in the learners' level of listening comprehension.

Similar to the learners' listening comprehension, their reading comprehension was also affected by the flipped model of instruction in the study conducted by Karimi and Hamzavi (2017). The researchers applied flipped teaching in reading comprehension classrooms by providing instructional videos for the learners before their presence in the classroom. The pre- and post-tests of reading comprehension revealed that the flipped model resulted in the EFL learners' improvementin reading comprehension. Moreover, data from the questionnaire indicated the EFL learners' positive attitudes on using flipped teaching. It was concluded, "EFL teachers can develop new and customized ways to improve the flipped model effectiveness in their teaching environments and they can modify it based on their students' needs and interests" (p. 101).

There are also numerous studies regarding the effect of flipped teaching on critical thinking skill. Alsowat (2016) demonstrates the positive effect of flipped education on critical thinking skills. Similarly, Kong (2014) states that flipped teaching is useful in the growth of domain knowledge and critical thinking. In a different study (Kong, 2015) investigated the outcome of critical thinking achievement of students with subjects being taught through flipped teaching, the results indicated that learners' overall competence in critical thinking skills improved significantly.

Nurmasita (2018) investigated the integration of flipped classrooms for increasing student participationin English for specific purposes class for students of engineering. She taught that the students needed to know English to be highly qualified in their field. In her study, she used the flipped classroom as an aid for the learning-teaching process to turn learners into active participants of learning. To do so, she tried to

apply technology in a flipped classroom instead of a conventional classroom. In the study, she used an interview and questionnaire sheet to collect data, and the results of her study showed that students had active participation in the class. They actively joined the discussion between lecturer-students, students-lecturer, and students-students. The outcome of the interview and questionnaire indicated that the students enjoyed the use of flipped classroom method in ESP class since they had more chance to practice their English in peer discussion with the teacher as a facilitator.

In another research by Sarpparaje, Rathiga, and Sasirekha (2018), they investigated the flipped classroom as an approach to utilize the ESL classes for ESL students. They stated that a flipped classroom had been highlighted as an emerging technology for higher education. The Flipped Classroom Approach is chosen to be the thrust area of their study as it has the prospective to prove that how the creation of a piece of communication goes beyond traditional features such as merely learning the grammar and syntax in ESL classes. They investigated two groups of control and experimental, and the results of their study revealed that students had a preference over this Flipped Classroom Approach and that this approach proved to contribute a lot to their communicative experience.

In summary, the literature above clearly denotes that flipped teaching is a learner-centred instructional model in which learners are required to invest in their learning by reviewing and processing information before attending class and applying it through active participation in the classroom. In this setting, the teacher can spend more time interacting with students instead of lecturing (Bergman & Sams, 2012). According to Kong (2014), learners would be expected to think for themselves and find ways for solving problems as well as producing knowledge rather than reproducing it. Flipped teaching uses the concept of active students engaged in learning. The lack of research concerning applying critical thinking in the flipped classroom, particularly in the EFL context, such as Iran, demands the role of using technology in flipped teaching in critical thinking instruction to enhance learners' listening comprehension. In the present study, the focus is on comparing the impact of flipped teaching via Google Classroom based on critical thinking instruction on the listening comprehension of Iranian EFL learners at an intermediate level. Therefore, the following research questions are addressed:

1. Does critical thinking instruction through flipped teaching (via Google Classroom) have any significant impact on Iranian EFL learners' listening comprehension?
2. Is there any significant difference between the effects of flipped teaching with and without critical thinking instruction on Iranian EFL learners' listening comprehension?

METHOD

Design

Following a pretest-posttest Quasi-Experimental Design, the current study investigated the effects of critical thinking instruction through flipped teaching on language learners' listening comprehension. The flipped classroom and instruction on critical thinking were the independent variables, and the learners' listening comprehension was the dependent variable. To establish the internal and external validity of the research, extraneous variables that could affect the learners' listening comprehension test scores were controlled. For instance, environmental clues like the researcher's non-verbal behavior and situational variables such as noise, temperature, and lighting were considered carefully in both flipped and traditional classes. The participants were pretested on listening comprehension before the intervention of the treatment, and then a posttest was given at the end of the study. Differences between the pretest and the posttest data were then analyzed.

Participants

The participants were 80 intermediate female EFL learners from the Training Department of the National Iranian Oil Company (NIOC) in Masjid Suleiman, Iran. They were selected from among 200 female language learners who attended the 2018 summer semester foreign language learning program. Due to the gender constraint in the department, only the female employees were selected for the study based on convenience sampling. Moreover, the inclusion criteria was based on the Quick Placement Test (QPT), and 80 learners

whose score fell within the range of 37-47 were considered to be at the intermediate level based on QPT test direction and were selected as the main sample for the present study. The subjects were all Persian native speakers within the age range of 19 to 29 years old. The participants of the study were divided into two experimental and two control groups, with 20 participants in each group. Before the study, the learners were surveyed to see if they had been in a flipped teaching class before. It was found that none of the participants had been.

Furthermore, the teacher gave the learners a general overview of the study, including the main purpose of conducting such a survey. Finally, to avoidthe experimenter`s expectancy and bias, the researcher checked the collected data and the results of the statistical analyses carefully and avoided interpreting the data during the study. Moreover, a colleague who was an expert in the field was invited to read the final report and provide the researcher with critical feedback on the research findings.

Instruments and Instructional Materials

The explanations of the instruments and materials are provided below:

Quick Placement Test (QPT)

Since based on a determined level of language proficiency, for the selected sample, only intermediate level learners were included. The paper and pencil version of the Quick Placement Test (Syndicate, 2001) was used to determine this. The test took approximately 30 minutes to be completed. The participants answered three parts that included items related to structure, vocabulary, and reading comprehension in the form of multiple-choice items with a maximum possible score of (60) points. According to Berthold (2011), QPT has been widely utilized as a placement test by second/foreign language researchers and has an acceptable reliability coefficient. Geranpaye (2003) also states that the test includes items, which have gone through Cambridge ESOL quality control procedures. The reliability coefficient of the QPT was estimated through the Cronbach's Alpha test, and it came to (α= .79).

The Pretest and Posttest of Listening

Two IELTS listening tests that included 40 items, taken from the listening section of the Cambridge IELTS Practice Test (Cambridge University, 2005), were used in this study. The IELTS test is an international standardized test that is a highly effective instrument and a reliable means of grading learners at all levels from lower intermediate upwards, with a consistent record of predictive validity in the light of examination entry. Two distinct listening tests were selected to minimize the possible memory factor due to the nature of the data collection procedure of the study. The level of difficulty of the test increased through the sections. It included both lecture formats as well as a formal and informal conversational style.

It took approximately 30 minutes for the participants to complete the pretest and posttests of the listening exam, and they were given an extra 10 minutes to transfer the answers to the answer sheet. Different types of questions were classified into four sections, including two dialogues and two monologues that measured the participants' listening for specific information as well as their listening for the main ideas and supporting information. In both tests, the first section was a conversation between two people set in an everyday social context. The second section was a monologue set in an everyday social context. The third section was a conversation set in an educational or training context, and the fourth section was a monologue on an academic subject. The participants were told that they could hear each section once only. Some listening skills were examined, including grasping the main ideas, understanding specific information, identifying opinions and attitudes, recognizing the purpose of the speaker, and following the development of an argument. Each correct answer received one point. The scores achieved out of 40 were then converted to the IELTS 9-band scale. The reliability indices of the pretest and posttest were checked through computing Cronbach's Alpha that is based on an analysis of variance (See Table 1).

Table 2 showed that the reliability coefficients for the pretest and posttest of listening comprehension were .71 and .74, respectively, which were both higher than the minimum possible amount required that is .70, demonstrating an acceptable reliability value (Farhady, Jafarpour, & Birjandi, 1994).

Google Classroom

In google classrooms, the participants of the study received the instruction on listening skills through handouts, brochures, PowerPoint presentations, and online videos. They also listened to the audio files in their preferred time and need, and then they were required to answer some questions that examined their listening comprehension before they attended the class. During the class, the participants were encouraged to ask and answer questions about the content. They were engaged in learning activities where they practised what they had learned before class. The teacher taught the lesson out of the class time, guided the learners to do their homework in class collaboratively, and encouraged them to have lots of interaction with their peers. However, for the first experimental group, the focus was also on teaching how to think critically and improving their listening comprehension through the flipped classroom. The learners in this group were required to process information from different sources that were available through a flipped classroom method and then critically process the information to construct knowledge. The purpose was to help learners develop and apply critical thinking skills in daily learning. To this end, they were encouraged to integrate different elements of critical thinking skills into their learning process in a flipped classroom settings.

Data Collection Procedure

Initially, a quick placement test was administered to 200 EFL learners, of which 80 intermediate EFL learners were selected based on the QPT test direction. They were then randomly divided into two experimental and two control groups. Subsequently, the four groups' listening comprehension was pretested with the IELTS listening proficiency test (Cambridge IELTS, 2005) to assess their entry performance. The two experimental groups received training using a flipped teaching method through a Google Classroom setting, while the two control groups received listening training in traditional classes. The study was carried out for 16 sessions during the summer semester in 2018.

The classes for the experimental groups were equipped with laptop and video projection, where the teacher went on the internet to show the participants how to reach the Google Classroom platform. The participants downloaded the materials three nights before each session, and they watched the videos at home very carefully. The learners were required to take notes, record their questions, and summarize their learning before class. There were some textually elicited questions that were raised by the teacher, and the participants were required to answer them based on the video materials they had received to perform classroom activities. The teacher also asked them some related questions at the beginning of the class to ensure that the participants had watched the learning materials beforehand. However, in the control groups, where the teaching method was traditional classroom-based learning, the learners were not required to do any specific kind of activity before the listening class except for some traditional preparation.

In both experimental groups, listening comprehension was taught according to American English File 1 (second edition) using flipped teaching strategies like problem-solving activities and group work, followed by the teacher's feedback. The flipped teaching consisted of four main sections, including pre-lesson learning through which the learners viewed lesson goals, downloaded worksheets, and completed them after group discussions. However, simply for the first experimental group, the worksheets had been developed in a way that included some questions to help students go through the five essential components of the critical thinking process (i.e., hypotheses identification, making inductive and deductive thinking, and conclusion explanation and evaluation). The next typical section for the two experimental groups was the lesson learning, in which the learners read the learning materials provided to them. The instructional materials comprised of recordings of the short stories, monologues, and dialogues selected from the net for the intermediate language learners. These recordings were sent to the experimental groups before they attended the class; the same material was played in the classroom for the control groups. The primary instructional materials included listening passages accompanied with related audio CD`s that were selected from the book 'American English files' series. In the third phase of the flipped teaching that was post-lessonn learning, the learners completed self-reflection, and finally, for the fourth section, the learners discussed what they had learned in-groups. The learners were encouraged to engage in concepts by participating in group-work activities with the teacher's guidance. Therefore, in the two experimental groups, language learners were encouraged to cooperate with their classmates in the lessons and solve problems through creating a cooperative environment by the teacher during the class.

For the participants in the first experimental group, the teacher used exercises to develop the participants' critical thinking. For this group, five major views of critical thinking skills, namely, hypothesis identification, induction, deduction, explanation, and evaluation, were worked on when giving instructions were given on listening skills in a flipped classroom setting. These learners were asked to answer different types of listening comprehension questions that enhanced their critical thinking. For instance, they were sometimes required to select a sentence that showed the acceptable hypothesis behind the given statement in the listening passage or sometimes were asked to select a sentence that showed the correct inference that could be derived from the given scenario in the listening passage. Moreover, these language learners selected a sentence that represented the proper conclusion for the given statements in the listening passage. Also, some questions asked them to select a sentence that showed the valid reason behind the given scenario in the audio file. Finally,, they were asked to evaluate their reasoning and examine its validity.

The selected book for the control groups was also American English File1 (second edition). The class was the teacher-centered. The teacher used the traditional way of teaching listening comprehension in which the teacher played the recordings, and the participants listened to them, then they answered the related questions. The teacher used some visual aids like slides or videos in class, and the learners completed the assignments at home. During class time, the teacher verbalized information in a controlled environment, and the learners simply practised note taking. Most of the teaching took place in the classroom with the physical presence of the teacher and learners in the class. The teacher began the class by doing some warm-up activities, and then a review of the previous session was given. Next, the new materials were taught through face-to-face interaction between the teacher and the learners, and finally, the teacher guided them to do the exercises at home.

The post-tests of listening comprehension were run at the end of the study to examine the effect of flipped teaching on learners' listening comprehension.

The researcher asked for the participants`permission to make use of the results of their IELTS tests for the study, and all the learners were asked to complete a consent form. Learners were guaranteed that their test performance would remain confidential. To ensure confidentiality, the participants' test results were not shared with NIOC teachers or administrators for the duration of the study.

Data Analysis Procedure

Descriptive and inferential measures were conducted to address the research questions. The learners' changes in their mean listening comprehension test scores were descriptively reported. However, inferential statistics gathered by running independent samples t-tests were used to investigate the differences between the experimental and control groups as well as the two experimental groups separately. It is worth mentioning that the assumption of normality was checked through computing Skewness and Kurtosis values. Since these values were within the range of +1.99, the assumption of normality was established.

FINDINGS

The results of the study are provided below, taking into account the two research questions of the study.

The First Research Question

To address the first research question, comparisons were made between the language learners who attended flipped classes with critical and without critical thinking and those who were in traditional classes in terms of their listening comprehension test scores. Group statistics for the pre- and post-test scores of listening comprehension are given in Table 1.

Table 1. Group Statistics for the Listening Tests

	Class	N	Mean	Std. Deviation	Std. Error Mean
pre	Flipped class	40	3.7913	.38683	.06116
	Traditional class	40	3.7688	.94331	.14915
	Mean difference = .022				
post	Flipped class	40	5.0119	.63228	.09997
	Traditional class	40	3.7969	.94803	.14990
	Mean difference = 1.215				

As Table 3 shows, for the listening pre-test, the mean scores for the flipped class and the traditional groups were 3.79 and 3.76, respectively, which were very close to each other. The mean scores for the post-test of flipped class and the traditional groups were 5.01 and 3.79, respectively, showing a large difference between the groups. While in the pre-test of listening comprehension the mean difference between the flipped class and the traditional class was .022, the differences between the flipped group and the traditional group in post-test of listening comprehension amounted to 1.215, which descriptively denotes the outperformance of the experimental groups over the control ones' listening comprehension. T-tests were run on the independent samples pre- and post-tests listening comprehension results for both groups to make a comparison between the groups in terms of their performance on the listening test and to see if these differences were statistically significant. The results are shown in Table 2.

Table 2. Independent Samples T-Test for the Listening Tests of Flipped Group versus Traditional Group

		Levene's Test for Equality of Variance		t-test for Equality of Means					
								95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)		Lower	Upper
pretest	Equal variances assumed	31.41	.000	.140	78	.889		-.298	.343
	Equal variances not assumed			.140	51.75	.890		-.301	.346
posttest	Equal variances assumed	8.93	.004	6.74	78	.000		.856	1.573
	Equal variances not assumed			6.74	67.96	.000		.855	1.574

Table 4 shows that although the two groups' performance in the pre-test of listening comprehension was almost identical, the results revealed that flipped classes affected the listening comprehension of the two groups differently in the post-test data (pretest=.140, P>.05; t posttest=6.74, P<.05). According to the results, the learners who experienced a flipped teaching method (via Google Classroom) significantly performed better than the traditional group in the post-test of listening comprehension.

Second Research Question

The second research question looked at the differences between the two flipped classes (with and without critical thinking treatment) in terms of the participants' listening comprehension test scores. Group statistics for the pre- and post-test scores of listening comprehension for the two flipped classes are given in Table 4.

Table 3. Group Statistics for the Listening Tests of Flipped Classes

	Treatment	N	Mean	Std. Deviation	Std. Error Mean
pre	critical thinking based	20	3.9035	.42171	.09430
	Non-critical thinking based	20	3.6790	.32061	.07169
	Mean difference		.23		
post	critical thinking based	20	5.4000	.43800	.09794
	Non-critical thinking based	20	4.6237	.55822	.12482
	Mean difference		.77		

For the first administration of listening test, the mean scores for the flipped classes with critical thinking based instruction and the flipped class without critical thinking based instruction were (M Flipped with critical thinking (pretest) = 3.90; SD= .42) and (M flipped without critical thinking (pretest) = 3.67; SD= .32), respectively. In other words, the results obtained for the pre-test scores were close to each other. For the second administration of the listening test, the mean scores for the two experimental groups were somehow different (M Flipped with critical thinking (posttest) = 5.40; SD= .43) and (M flipped without critical thinking (posttest) = 4.62; SD= .55). In other words, the students in the flipped classes with critical thinking-based instruction had a higher mean score. The mean difference between the two flipped groups in the pre-test of listening comprehension was (mean difference= .22). However, the differences in posttest listening comprehension amounted to (mean difference= .77). T-tests were run on the independent samples pre- and post-test of listening comprehension results for both flipped groups to check if the differences between the two flipped classes were statistically significant. The results are shown in Table 4.

Table 4. Independent Samples T-Test for the Listening Tests of Flipped Classes

		Levene's Test for Equality of Variance		t-test for Equality of Means			95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Lower	Upper
pretest	Equal variances assumed	.89	.350	1.89	38	.066	-.015	.464
	Equal variances not assumed			1.89	35.46	.066	-.015	.464
posttest	Equal variances assumed	2.44	.126	4.89	38	.000	.455	1.097
	Equal variances not assumed			4.89	35.96	.000	.454	1.098

As can be seen in Table 6, although the two groups performed similarly in the pre-test of listening comprehension, the results of the t-tests revealed that critical thinking based instructions in flipped classes were more effective in developing the language learners' listening comprehension as opposed to non-critical thinking. The two groups performed differently in the post-test (t pretest= 1.89, P > .05; t posttest=4.89, P< .05). According to the results, in the post-test of listening comprehension, the flipped group who enjoyed critical thinking-based treatment significantly performed better than the flipped group that had non-critical thinking-based instruction.

The results showed that providing critical thinking instructions through a flipped class setting was beneficial, and improved EFL learners' listening comprehension. Furthermore, there were statistically significant differences between critical thinking through flipped teaching and without critical thinking through flipped teaching on Iranian EFL learners' listening comprehension, indicating as to why the group that received critical instructions outperformed those who had not in the second experimental group.

DISCUSSION

The present study was an attempt to investigate the effects of the development of EFL learners' critical thinking through flipped teaching on their listening comprehension ability. The differences between the experimental and control groups were also examined.

The quantitative analysis of the pre-test and post-test of listening scores revealed that flipped teaching had been advantageous in enhancing the learners' listening comprehension compared with the traditional classes. These conclusions are in line with the findings of studies conducted by Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt, Wenderoth (2014), who showed that student performance is enhanced when active learning components like flipped classes are employed. Additionally, the findings are similar to those reported by McGivney-Burelle and Xue (2013), who found that students in flipped classrooms have better opportunities to be involved in purposeful activities. The positive effect of flipped teaching might be due to the nature of a flipped classroom setting in which there are more interactions between the teacher and the language learners, and teachers can provide learners with immediate feedback. It can be argued that flipped classrooms can help learners reflect upon their learning behaviours since they are engaged in the learning environment, leading to being more consciously involved in the target language tasks (Alsowat, 2016; Kong, 2014). Fulton (2012) also emphasizes the role of flipped teaching in providing a thought-provoking learning setting for learners to be more creative in carrying out the learning tasks. Musallam (2010) supports flipped teaching and argues that flipped teaching provides language learners with a ,productive learning environment in which they can freely take part in a cooperative learning setting.

Besides, the results also revealed that critical thinking instructions through flipped teaching could significantly develop the learners' listening comprehension ability. It was found that in a technology-mediated learning environment where a Google Classroom was implemented in a flipped teaching setting, learners were able to develop their inferencing, interpreting, and argumentative skills and were found to to be more engaged in the learning environment. This might be related to the fact that the learners in the first experimental group who practised remembering and understanding outside the class. At the same time, they focused on applying, analyzing, evaluating, and creating in the classroom had sufficient time to solve problems individually and collaboratively. Moreover, the teachers in the first experimental group had adequate amount of time to help language learners think and develop group-sharing activities among themselves. The Findings of the study are in alignment with research studies conducted by Bergmann and Sams (2012) and Musallam (2010) who argued that a flipped learning environment could provide sufficient assistance for the learners to be reflective and think as critically as possible in doing the target tasks in the classroom. Alsowat (2016) also acknowledged the role of flipped teaching in paving the way for learners to develop their critical thinking ability. As to the findings of the present study, critical thinking instruction in the flipped classroom led to encouraging the learners to analyze, interpret, and infer their working on the listening tasks, which is in agreement with research studies done by Sarani et al., (2014). When learners are given directions and values to play the role of a critic in a flipped classroom setting, it is expected that they become more autonomous in their learning experience (Wagner, 2010). Also, the students in the flipped classroom were able to self-regulate their learning environment and be critical thinkers while doing the listening tasks (Kong, 2015). It also seemed that stimulating the learners' critical thinking ability boosted the learners' active learning (Tyson, 2015) in the listening classroom (Samah & Saka, 2016), enabling them to enjoy the interactive learning atmosphere caused by flipped classroom simultaneously.

On the other hand, the language learners in the first control group who received instructions on critical thinking through traditional classes did not improve their listening comprehension as much as the participants in the first experimental group who practiced critical thinking instructions in a flipped classroom did. In this respect, Berrett (2012) argues that traditional classroom-basedd learning appears to reduce the learning opportunities since the teacher cannot apply the entire capacity of teaching. Language learners who simply attended lecture-based traditional classes had fewer chances to receive their teacher's immediate and meaningful feedback as compared to the students in the flipped classrooms. They were rarely encouraged to engage in class activities due to the shortage of time. Besides, they also had limited interactions with their peers. These findings are in line with the results of Bergmann & Sams (2012) who reported that implementing flipped teaching provides an interactive learning atmosphere for learners to get in touch with their peers more eagerly through video and on-line technology.

Concerning the pedagogical benefits of flipped teaching, Kong (2015) believed that flipped teaching could provide a supportive learning environment for the learners to have more cooperation with their peers while being able to foster their critical thinking abilities by taking part in challenging tasks. Using a variety of tasks as well as involving the learners in classroom activities can be convincing enough to defend the pedagogical effect of flipped teaching on the learners' performance.

CONCLUSION

The current study investigated the effects of critical thinking instructions through flipped teaching on Iranian EFL learners' listening comprehension. The results of descriptive and inferential measures were very positive. In favour of flipped teaching, they demonstrated that flipped teaching on its own could have a significant impact on the learners' listening comprehension. Moreover, by comparing the two experimental groups, it was found that critical thinking instructions through flipped teaching significantly resulted in the learners' improved listening comprehension.

The results of the study revealed that although some of the language learners resisted the integration of flipped classrooms into the language learning environments, flipped teaching could be a reliable teaching methodology for teachers to add more variety in their teaching to encourage self-regulated learning. eWhile conducting the present study, it was noticed that running language courses based on a flipped model was highly challenging as it required more time and was financially more expensive, as language learners needed to have technological support. However, the results show that there were benefits for student learning and maintained student engagement and encouraged students to take ownership of their learning. It could be concluded that language learners improved higher-order of thinking was attributed to the active technology-based learning environment created as a result of implementing a flipped classroom setting that brought a different style of teaching listening comprehension. Therefore, the flipped classroom can be considered as an alternative to a traditional class in which the learners are required to do the mandatory tasks and be the classical learners who are listening to the teacher while taking notes (William & Wuensch, 2016). However, the flipped classroom can bring about the learners' liveliness in doing the expected tasks more cooperatively since the teacher plays the role of a facilitator who monitors the classroom interaction to keep students more engaged in the classroom and encouraging them to take ownership of their learning environment (Morrison, 2014; Van Veen, 2013).

The learners in the flipped classroom have the chance to challenge the tasks, share their proposed doubts with the class, and then interpret their findings in collaboration with their peers (Musallam, 2010). Therefore, flipped teaching enhances learning opportunities, and the learners' critical thinking will be developed through challenging classroom interactions. Independent learning will be encouraged since the teacher's concern is directed toward training autonomous learners through active involvement in the classroom is a critical fashion. In the flipped learning environment, the learners are allowed to evaluate, analyze, and interpret the provided tasks while being armed with the teacher's facilitative feedback, aiming to trigger more participation in the classroom by taking advantage of class time in the best way (Brown, 2012). It is suggested that language teachers implement flipped classrooms so that they can play their facilitative role by utilizing differentiated learning approach to guide the learners to get mastery over the content themselves and to clarify the exciting misconceptions collaboratively.

Overall, many studies have investigated different features of EFL flipped classrooms. However, there are still some aspects of flipped teaching that require further investigation. Future studies can examine the possible effects of the flipped classroom approach on EFL learners' critical thinking concerning other skills such as speaking or writing or monitor the effectiveness of flipped teaching for vocabulary instruction. The flipped classroom provides the learners with an excellent excellent opportunity to think reflectively and make decisions on selecting appropriate information for learning.

Limitations of the Study

The main limitation of this research is that the study was designed for female intermediate learners, which means that the results from this study cannot be extrapolated to other contexts, including male learners at different levels. Guaranteeing that all the participants were technologically educated was another limitation

of the study since it was impossible and out of the researchers' control to check the participants' knowledge of using technology. Finally, inaccessibility to native English teachers can be considered as a limitation of the present study, as applying native teachers in an EFL setting can affect the learners' performance.

Thus further research can be done with the participation of a larger sample to meet the issue of generalizability in using flipped teaching in teaching language skills. Furthermore, it is recommended to do an investigation of the impact of flipped teaching on other skills such as writing, reading, and speaking. Prospective researchers are advised to take into account various technological devices, software programs, and mobile apps to provide a more facilitative learning environment through flipped teaching. More significantly, because running flipped teaching might be of a challenge for EFL teachers, further researches can be conducted to provide teachers with training to raise their awareness of flipped instruction and then analyzes their expertise in practice.

BIODATA and CONTACT ADDRESSES of AUTHORS

Dr. Sara SHAHANI is a lecturer at English Department, Jondi Shapour University (Salamat Institute), Masjed Soleiman, Khuzestan, Iran where she teaches English courses to the Nursing students. She also teaches at the Training Department of the Oil Company in Masjed Soleiman. She is a supervisor at Sama Schools in Masjed Soleiman. She got her Ph.D. in TEFL from Isfahan Azad University (Khorasgan) Branch in 2020 with distinction. She is the reviewer at the Research in English Language Pedagogy (RELP) and the Journal of New Advances in English Language Teaching and Applied Linguistics (JELTAL). Her research interests include distant learning, classroom management, E-mail communications, Computer-Mediated Communication.

Sara SHAHANI
Department of English, Isfahan (Khorasgan) Branch
Address: Islamic Azad University, Isfahan, Iran
Phone: +98-9133204340
E-mail: s.shahani1354@gmail.com

Dr. Azizeh CHALAK is an associate professor at English Department, Islamic Azad University, Isfahan Branch, Isfahan, Iran, where she teaches English to graduate and undergraduate students for 20 years. She got her Ph.D. in TEFL from University of Isfahan (UI), Iran, and was a visiting research student at the English Department at University of Albert Ludwigs, Freiburg, Germany. She is the editor-in-chief of Research in English Language Pedagogy (RELP) published at IAU, Isfahan Branch and was selected as the top researcher of English Department in 2017, 2018, and 2022. Her research interests include Discourse Analysis, Sociolinguistics, Intercultural/Cross-cultural Communication, E-mail Communications, Computer-Mediated Communication (CMC), and Ethnography of Communication. Her main hobby is practicing marquetry (Moshabak, and Moaaragh) and She has been working as a professional marqueter for 18 years. She has attended many domestic and International exhibitions. Her last national exhibition was in Isfahan, Iran in 2018 and the last international one was in Freiburg, Germany in 2015. Her other hobbies are drawing and painting, visiting art galleries and exhibitions, sports (squash, shooting, aerobics, and swimming), knowing and learning different languages (Persian, English, Azeri, German, Turkish, and Arabic), reading novels, traveling around the world, and surfing the Internet.

Azizeh CHALAK
Department of English, Isfahan (Khorasgan) Branch
Address: Islamic Azad University, Isfahan, Iran
Phone: +98-3135354174
E-mail: azichalak@gmail.com

Dr. Hossein Heidari TABRIZI is an associate professor of TEFL at an English Department of Islamic Azad University, Isfahan Branch, Isfahan, Iran. He has been teaching different courses at PhD, MA, and BA levels in TEFL, Translation studies, and General Linguistics since 1994. He has presented and published various papers at different conferences and journals both at international and national levels, and has been the reviewer of different journals or research projects. He is the founder of Research in English Language Pedagogy (RELP) published at IAU, Isfahan Branch and was selected as the top researcher of English Department in 2016. His research interests include Language Assessment and Testing, Translation Studies, Discourse Analysis, and Sociolinguistics.

Hossein Heidari TABRIZI
Department of English, Isfahan (Khorasgan) Branch
Address: Islamic Azad University , Isfahan, Iran
Phone: +98-3135354174
E-mail: heidaritabrizi@gmail.com

REFERENCES

Ahmad, S. Z. (2016). The flipped classroom model to develop Egyptian students' listening comprehension. English Language Teaching, 9(9), 166-178.

Ahmadi, M.R. (2018). The use of technology in English language learning: A literature review. International Journal of Research in English Education, 3 (2), 115-125.

Al-Harbi, S. S., & Alshumaimeiri, Y. A. (2016). The flipped classroom impact in grammar class on EFL Saudi secondary school students' performance and attitudes. English Language Teaching, 9(10), 60-80.

Alsowat, H. (2016). An EFL flipped classroom teaching mode: Effects on English language higher-order thinking skills, student engagement and satisfaction. Journal of Education and Practice, 7(9), 108-121.

Alsulami, S. (2016). The effects of technology on learning English as a foreign language among female EFL students at Effatt college: An exploratory study. Studies in Literature and Language, 12(4), 1-16.

Baker, J. W. (2000). The 'classroom flip': Using web course management tools to become the guide on the side. In J. A. Chambers (Ed.), Selected papers from the 11th International Conference on College Teaching and Learning (pp. 9-17). Jacksonville, FL: Florida Community College at Jacksonville.

Bergmann, J., & Sams, A. (2012). Flip your classroom: Reach every student in every class every day. Washington, DC: International society for technology in education.

Berrett, D. (2012). How 'flipping' the classroom can improve the traditional lecture. The Chronicle of Higher Education, 12(19), 1-14.

Berthold, M. (2011). Reliability of Quick Placement Tests: How much faith can we place on quick paper or internet based placement tests? Australian Journal of Teacher Education, 35(6), 1-23.

Boucher, B., Robertson, E., Wainner, R., & Sanders, B. (2013). "Flipping" Texas State University's physical therapist musculoskeletal curriculum: Implementation of a hybrid learning model. Journal of Physical Therapy Education, 27(3), 72-77.

Brown, M. J. W. (2012). Teachers and students' perceptions regarding technology-assisted instruction in 10th-grade mathematics classrooms (Doctoral dissertation). Available from https://eric.ed.gov

Brown, N. J., Afflerbach, P. P., & Croninger, R. G. (2014). Assessment of critical-analytic thinking. Educational Psychology Review, 26(4), 543-560.

Brownell, J. (2013). Listening: Attitudes, principles, & skills. New York: Routledge.

Bull, G., Ferster, B., & Kjellstrom, W. (2012). Connected Classroom-Inventing the Flipped Classroom. Learning and Leading with Technology, 40, 10.

Cambridge University. (2005). Cambridge IELTS 4: Examination Papers from the University of Cambridge ESOL Examinations. Cambridge: Cambridge University Press.

Collins, A., & Halverson, R. (2010). The second educational revolution: Rethinking education in the age of technology. Journal of computer assisted learning, 26(1), 18-27.

Datig, I., & Ruswick, C. (2013). Four quick flips: Activities for the information literacy classroom. College & Research Libraries News, 7(5), 249-251 & 257.

Farhady, H., Jafarpour, A., & Birjandi, P. (1994). Testing language skills. Tehran: SAMT Publications.

Fink, L.D. (2003). Creating Significant Learning Experiences. San Francisco, CA: Jossey Bass.

Freeman, S., Eddy, S. L., Mcdonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active Learning Increases Students' Performance in Science, Engineering, and Mathematics. Proceedings of the National Academy of Sciences of the United States of America, 111, 8410-8415. http://www.pnas.org/content/111/23/8410.full.pdf

Fulton, K. (2012). Upside down and inside out: Flip your classroom to improve student learning. Learning & Leading with Technology, 39(8), 12-17.

Gonen, M. (2009, July). The relationship between FL listening anxiety and FL listening strategies: The case of Turkish EFL learners. Proceedings of the 5th WSEAS/IASME International conference on educational technologies (pp. 44-49).

Graham, S. (2006). Listening comprehension: The learners' perspective. System, 34(2), 165-182.

Graham, S. & Macaro, E. (2008). Strategy instruction in listening for lower-intermediate learners of French. Language Learning, 58(4), 747-783.

Hao, Y. (2016). Middle school students' flipped learning readiness in foreign language classrooms: Exploring its relationship with personal characteristics and individual circumstances. Computers in Human Behavior, 59, 295-303.

Hutchings, M., & Quinney, A. (2015). The flipped classroom, disruptive pedagogies, enabling technologies and wicked problems: Responding to 'the bomb in the basement'. Electronic Journal of E-Learning, 13(2), 106–119.

Karimi, M., & Hamzavi, R. (2017). The effect of flipped model of instruction on EFL learners' reading comprehension: Learners' attitudes in focus. Advances in Language and Literary Studies, 8(1), 95-103.

Kong, S. C. (2014). Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy. Computers & Education, 78, 160-173.

Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. Computers & Education, 89, 16-31.

McGivney-Burelle, J., & Xue, F. (2013). Flipping Calculus. PRIMUS, 23(5), 477-486.

Manzouri, H., Shahraki, A., & Fatemi, S. (2016). Effect of listening proficiency on types of listening strategies used by Iranian EFL learners. International Journal of English Language and Translation Studies, 30-41.

Marijic, I., & Romfelt, M. (2016). Critical thinking in English as a foreign language instruction: an interview-based study of five upper secondary school teachers in Sweden. Available from http://lup.lub.lu.se/student-papers/record/8886384

Morrison, C. D. (2014). From 'sage on the stage' to 'guide on the side': A good start. International Journal for the scholarship of teaching and learning, 8(1), 4.

Musallam, R. (2010). The effects of using screen casting as a multimedia pre-training tool to manage the intrinsic cognitive load of chemical equilibrium instruction for advanced high school chemistry students. (Doctoral dissertation). Available from https://repository.usfca.edu

Nowrouzi, S., Tam, S. S., Zareian, G., & Nimehchisalem, V. (2015). Iranian EFL students' listening comprehension problems. Theory and Practice in Language Studies, 5(2), 263-269.

Nunan, D. (2002). Listening in language learning. Methodology in language teaching: An anthology of current practice, 238-241.

Nurmasita, S. (2018). Integrating technology in flipped classroom for increasing student participation at English for specific purposes class. [Paper Presentation]. The Asian EFL`s Journals of International Conference on Research & Publication.

Ouda, H., & Ahmed, Kh. (2016). Flipped learning as a new educational paradigm: An analytical critical study. European Science Journal, 12 (10), 417-444.

Peralta, L. R. (2017). Critical thinking in an ESL classroom: What, Why, How? presented at English Language Teaching Conference, 2017, Institute for Tourism Studies.

Paul, R. (2012). Critical Thinking: What Every Person Needs To Survive in a Rapidly Changing World. Tomales, CA: Foundation for Critical Thinking.

Pink, D. (2010). Think tank: Flip-thinking - the new buzz word sweeping the US, The Telegraph, Retrieved from: URL: http://www.telegraph.co.uk/finance /businessclub/7996379/Daniel-Pinks-Think-Tank-Flip-thinking-the-new-buzz-word-sweeping-the-US.html

Raths, D. (2014). Nine video tips for a better flipped classroom. Education Digest, 79(6), 15-21.

Sarpparaje, M., Rathiga, K., & Sasirekha, K. (2018). Flipped Classroom Approach to make the best utilization of ESL classes at Mepco Schlenk Engineering College – A try out [Paper Presentation]. The Asian EFL`s Journals of International Conference on Research & Publication.

Sarani, A., Behtash, E. Z., & Arani, S. M. N. (2014). The effect of video-based tasks in listening comprehension of Iranian pre-intermediate EFL learners. Gist: Education and Learning Research Journal, 8, 29-47.

Sengel, E. (2016). To FLIP or not to FLIP: Comparative case study in higher education in Turkey. Computers in Human Behavior, 64, 547–555.

Soliman, N. A. (2016). Teaching English for academic purposes via the flipped learning approach. Procedia-Social and Behavioral Sciences, 232, 122-129.

Syndicate, U. C. L. E. (2001). Quick placement test. Oxford: Oxford University Press.

Tyson, L. (2015). Critical Theory Today (3rd ed.). Taylor Francis.

Van Veen, B. (2013). Flipping signal-processing instruction. Signal Processing Magazine, 30(6), 145-150.

Vaughan, M. (2014). Flipping the learning: An investigation into the use of the flipped classroom model in an introductory teaching course. Education Research & Perspectives, 41, 25-41.

Wagner, E. (2010). The effect of the use of video texts on ESL listening test-taker performance. Language Testing, 27(4), 493-513.

Yu, Z., & Wang, G. (2016). Academic achievements and satisfaction of the clicker-aided flipped business English writing class. Educational Technology & Society, 19(2), 298-312.

Zainuddin, Z., & Halili, S. H. (2016). Flipped classroom research and trends from different fields of study. International Review of Research in Open and Distance Learning, 17(3), 313–340.

Zeng, W. (2016). Exploration and practice of E-commerce course teaching in the era of MOOC. Theoretic Observation, 9, 176-177.