On the Comparison of the Effects of Conventional and Agent-Based Multimedia Instruction on the Learning of English Speech Acts Among Iranian EFL Learners

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Abstract

This research sought to compare the effects, if any, of a conventional method with those of agent-based multimedia instruction on the learning of English speech acts among Iranian EFL students. One hundred and twenty learners, chosen as the prospective participants of the study, were randomly assigned to two equivalent groups of experimental and control, each comprising a mix of male and female students. The two groups then received treatment on four major types of speech acts (i.e., making/responding to requests, expressing/responding to apologies, paying/responding to compliments, and issuing/responding to invitations). The experimental group received treatment through a multimedia application called Speech Act Tutorial (SAT) featuring animated pedagogical agents, and the control group received treatment through teacher fronted instruction. At the end of the experiment, the participants' mean scores on postintervention measures of L2 pragmatic ability were computed and subjected to a test of statistical significance. The results revealed that the mean difference was statistically significant in favor of the experimental group. Among the explanations is the idea that the presence of the *persona effect* and stronger *modality effect* in the multimedia learning environment capitalizing on the great potential of pedagogical agents had privileged the participants of the experimental group.

Keywords: agent-based multimedia instruction; Dual Coding Theory (DCT); pedagogical agents; speech act; Technology-Enhanced Language Learning (TELL)

Background

As Hymes (1972) aptly argues, learners need to develop all aspects of communicative competence to be able to achieve full mastery in a second language. Chief among the components of communicative competence is sociolinguistic competence, which is the knowledge of what is "feasible", "possible", and "done" with the linguistic or grammatical forms (Hymes, 1972, p. 281). Specifically, sociolinguistic competence refers to the competence required to perform specific speech acts in socially appropriate ways (Ellis, 1991). Developing sociolinguistic competence, then, involves the learning of the pragmatic aspects of different types of speech acts, namely the cultural values, norms, and other sociocultural conventions in social contexts (e.g., the context and topic of discourse, the participants' social status, sex, age, etc.), which influence the styles and registers of speech. Since different situations call for different types of expressions as

well as different sets of beliefs, views, values, and attitudes, the development of sociolinguistic competence is essential for communicative social actions.

Due to the sparseness of authentic language in pedagogical contexts, L2 learners are highly prone to becoming monostylistic communicators, often sticking with only one of the many styles ranging from informal to everyday, formal, and literary language (Dewaele, 2004). The process by which a classroom student becomes an L2 user in authentic socio-cultural contexts can be arduous for many learners who rarely, if ever, encounter naturally occurring informal or colloquial registers of the language (van Compernolle & Williams, 2011). Gass and Selinker (1983) likewise contend that when non-native speakers make pragmatic mistakes, they may be perceived as rude, uncooperative, arrogant, or insincere. Immigrants and international students often face communication challenges, as they are largely unaware of how native speakers can properly use the language in pragmatic contexts.

Convictions are strong that, to be prepared to face a large variety of L2 interactions to which they are exposed, learners need to be provided with tools that allow them to become aware of the pragmatic norms used by the L2 community and to distinguish them from separate individual behaviors (Hinkel, 2001). Several studies (e.g., Ament et al., 2020; Barron, 2019; Ifantidou, 2013; Takimoto, 2020) have suggested that exposure to L2 culture and its pragmatic norms alone does not suffice to guarantee the successful acquisition of such norms and that explicit instruction may be necessary for learners to develop the subtleties of native speaker pragmatics. Furthermore, instruction on appropriate linguistic forms alone may not guarantee that learners use them in appropriate social contexts. This argument underpins Cohen's (1996) view when he distinguishes between *sociocultural ability* and *sociolinguistic ability*.

Sociocultural ability refers to the ability of the speaker to choose appropriate speech act strategies, such as the provision of an explanation for the refusal of an invitation given the cultural norms and the participants' relationship, whereas the latter refers to the speaker's ability to choose appropriate linguistic forms that are used for realizing those speech acts. Similar concepts are found in the works of other authors. Canale (1983), for example, talks about the *appropriateness of meaning*, that is, the knowledge of when to perform a particular speech act, and *appropriateness of form* or the knowledge of proper verbal or non-verbal forms to be used in a certain situation.

Thomas (1983) also distinguishes between *sociopragmatic failure*, which is a failure to perform the illocutionary act required by the demands of a specific situation, and *pragmalinguistic failure*, which is a deviation from proper linguistic forms. In favor of these arguments, Blum-Kulka and Olshtain (1986) found that even high-intermediate and advanced L2 learners produce more verbose requests than do native speakers. Moreover, it has been found that even advanced L2 learners make errors when it comes to adjusting the level of politeness or mitigating the illocutionary force of their utterances (Francis 1997; Hinkel, 1996, 1999).

Studies on speech act instruction have also revealed that explicit instruction on speech acts plays a key role in raising students' pragmatic awareness and enhancing their sociolinguistic and sociocultural knowledge. For example, Soler (2007) explored the extent to which explicit and implicit instruction would affect learners' knowledge and ability to use the request strategies. The participants were randomly assigned to one of three groups (explicit, implicit, and control). The groups were then exposed to excerpts containing requests that were taken from different episodes of the TV series *Stargate*.

While the explicit group received instruction through direct awareness-raising tasks and receiving written metapragmatic feedback on the use of appropriate requests, the implicit group was provided with the typographical enhancement of request strategies and a set of implicit awareness-raising tasks. The results revealed that the participants benefited from both implicit and explicit instruction, albeit the explicit group showed greater improvement.

Similarly, Halenko and Jones (2011) evaluated the impact of explicit interventional treatment on the pragmatic awareness and production of spoken requests in an EAP context with Chinese learners of English at a British higher education institution. The study employed an experimental design with students assigned to either an explicitly instructed group or a control group receiving no instruction. Their performance was measured based on a pretest, an immediate, and a delayed posttest consisting of discourse completion tasks. The findings revealed that learners developed a positive view of pragmatic instruction and that explicit instruction greatly facilitated the development of pragmatically appropriate request language.

Whereas studies have thus corroborated the utility of many current methods and practices for teaching sociocultural knowledge, the advent of Technology-Enhanced Language Learning (TELL) approaches has also paved the way for English Language Teaching (ELT) enthusiasts to exploit the potential of computer technology to explore new, more innovative ways of teaching a second language. There have been studies on Computer-Assisted Spelling and Reading Instruction (Bosman et al., 2006; Engstrom et al., 2019; Heift & Rimrott, 2008; Regtvoort & van der Leij, 2007), Computer-Assisted Pronunciation Training (Felps et al., 2009; Moustroufas & Digalakis, 2007; Wang & Munro, 2004), Computer-Assisted or Computer-Supported Task-Based Instruction (Anwar & Arifani, 2016; González-Lloret, 2003), Agent-Based Multimedia Instruction (Wang, 2019; Wik & Hjalmarsson, 2009), Computer- Assisted Language Testing (Laborda, 2010; Lilley, Barker, & Britton, 2004; Maier et al., 2016; Wilson et al., 2017), and so on.

Bosman et al. (2006), for example, examined how computer-assisted instruction could improve spelling and reading accuracy among students with developmental disabilities. Felps et al. (2009) conducted an interesting study where they proposed a voice-transformation technique for changing the recorded pronunciation of English as a Foreign Language (EFL) learners into native-like pronunciation and using it as an ideal model for students' imitation. Wik and Hjalmarsson's (2009) research focused on two systems that used embodied conversational agents (ECAs) for language learning. The first system, called Ville, was a virtual language teacher for vocabulary and pronunciation training. The second system, a dialogue system called DEAL, was a role-playing game for practicing conversational skills. Whereas DEAL acted as a conversational partner to create and keep an interesting dialogue with learners, Ville took on the role of a teacher who could guide, encourage, and give feedback to the students. The results showed that increased levels of motivation generated in the participants led to their sustained attention, greater cooperation, and hence efficient learning on their part.

Even though technology holds great promise for maximizing the efficiency of L2 pedagogy and learning, little research so far has explored the effects of computer technology and its potential contribution to the development of learners' socio-cultural/socio-pragmatic knowledge. Integrating various multimedia components such as texts, audio, hyperlinks, stunning visual effects, and so on in a tutorial application

featuring animated pedagogical agents (APAs) offers great potential for raising learners' awareness of sociocultural conventions where the use of visuals combined with increased levels of motivation (Dincer & Doganay, 2017; Lin et al., 2020) generated as a result of sustained human-computer interaction could lead to deeper understanding, better storage, and longer retention of linguistic choices as well as the sociocultural norms constraining these choices. Due to a paucity of research on such contributions, however, further studies are required to corroborate these views.

Aims of the Study

Given the consequence of developing learners' pragmatic competence, designing a more effective teaching technique warrants closer inspection. Inspired by studies on the contributions of TELL approaches to L2 pedagogy, the present study sought to compare the effects, if any, of a conventional method of teaching English speech acts with those of a multimedia-based instruction on the learning of four major types of speech acts, namely requests, apologies, compliments, and invitations, among Iranian EFL learners. The rationale for the inclusion of requests in this study was that they are face-threatening acts, they differ cross-linguistically, and they are widely used by speakers of all ages and different statuses. Cross-linguistic differences, in particular, may pose some difficulties for learners concerning their linguistic choices when making requests. The choice of appropriate linguistic forms hinges on the number of social factors involved in a communicative event as well as on the degree of imposition (Sánchez-Hernández & Alcón-Soler, 2019).

Likewise, apologies were included owing to their face-threatening nature and because failure to apologize properly may cause resentment on the part of the offended party. In fact, following their interaction with native speakers, many adult language learners gain the impression that their intentions or motives have been misjudged, even though they have used the right words. Likewise, native speakers can perceive them as being rude, slow, or difficult (Blitvich & Sifinaou, 2019). As for compliments, their inclusion was perceived as being consequential, as failure to conform to native speakers' complimenting norms may deprive learners of opportunities to establish rapport with native speakers and of the input they need for the development of their linguistic and sociolinguistic competence (Sucuoğlu & Bahçelerli, 2015). Finally, the rationale behind the inclusion of invitations and compliments was the same: The use of appropriate strategies to give and respond to invitations or compliments as well as suitable linguistic structures to realize them is likely to expand the breadth of learners' pragmatic knowledge, thereby opening up great opportunities for their enhanced social interaction with native speakers.

Research Question

The present study sought to address the following question:

• Do teacher fronted and agent-based multimedia instruction vary in their effects in such a way as to differentially impact EFL students' learning of English speech acts?

Method

Participants

The sample of participants selected for the present study comprised a constellation of freshmen who were majoring in Teaching English as a Foreign Language (TEFL), Literature, Translation, and Linguistics at two Iranian universities. These were chosen based on the score they had obtained on an International English Language Testing System (IELTS) proficiency test. Following the nine-band rating scale developed by the University of Cambridge Local Examination Syndicate (UCLES), it was stipulated that all the participants who could obtain an overall band score of 4.5 to 5 would be identified as *modest users* (or intermediate learners in terms of their level of language proficiency) who then would be entitled to participate in the study. Freshmen were selected, as it was hypothesized that they were less likely to be familiar with a variety of speech acts in English as well as with diverse sociocultural contexts in which they could be appropriately used. From among the qualified candidates, a total of 120 students were randomly selected and assigned to two equivalent groups of experimental and control, each consisting of a mix of male and female participants. Participation was voluntary, and the participants would receive remuneration as their rewards. In a briefing session, they were assured that participation in the study would not cause them any physical or psychological harm; accordingly, no written consent was obtained from them, and their verbal confirmation was a clear indication of their strong desire for participation in the study.

Participant recruitment was done before the COVID-19 pandemic. The students were studying in the second semester of the academic year (2018-2019) which, for Iranian universities, began in early February 2019 and ended in late June 2019. The selection of the participants started at the beginning of April 2019 and took approximately one and a half months to complete. The experiment started in late May 2019, approximately three weeks before the students sat for their final examinations. The participants were required to turn up for four consecutive sessions where they would receive treatment on English speech acts. The sessions were scheduled around two intervals for each study group, that is, each group would attend two sessions, one in the morning and one in the evening, per day of the week, and for two consecutive days.

The participants were also required to come to the researcher's computer lab hosting 30 computer terminals inside cabins with acoustic walls. The computers came with a copy of the tutorial application pre-installed on their operating systems; accordingly; the participants could easily launch the application at the click of a button. To ease participation, the students were asked to negotiate with the researcher at a convenient time at which they could turn up for the treatment sessions. Likewise, care was taken so that the participants of different groups could not meet each other. This could greatly help prevent the information leakage and also help discount the possibility for history effect jeopardizing the credibility of findings. The participants were also assured that their privacy would be respected and protected and that their performance data would not be disclosed to the public.

Instruments

The main instrument used in the present study was an instructional multimedia

application called Speech Act Tutorial (SAT) developed by the researcher. Several thirdparty applications were used in the development of the tutorial: iClone¹, a puppeteering tool authored by Reallusion Inc., was the first tool employed by the researcher for the development of the main character, the pedagogical agent "Hamed," who embarked on the teaching of the speech acts and on walking the participants through the tutorial application. iClone features a motion capture (Mocap) plugin², allowing the user to use Microsoft Kinect³ to project his movements of the head, eyes, eyebrows, torso, hands, and legs to the virtual character that appears in the character customization screen accessible from the main interface of the application. The tool also comes with pre-set motion picture add-ons, enabling the developer to choose from among the many available options for animating the characters.

For making the virtual characters initiating a dialogue, setting the scene, and providing the context that would model the appropriate use of the English speech acts by native speakers, Cartoon Animator⁴ by Reallusion Inc. was used. Cartoon Animator allows the developer to choose from among available cartoon characters or to create a new one from scratch. Like its counterpart, iClone, Cartoon Animator comes with pre-set motion animations as well as *motion tweens*⁵ to allow for the movements of both characters and the background, which would create the impression that one is watching a lifelike, animate being gesturing and mimicking human's behavior.

The third tool employed by the researcher to enable the participants to initiate talks with the pedagogical agents was a speech recognition engine that would allow for parsing and segmenting the learners' speech into sequences of words which, later, would be compared to a database of plausible sentence structures which was embedded in the application package. This was made possible with the help of Google's cloud-based speech-to-text (Application Programming Interface) API⁶. To be used in the tutorial, the researcher would need to build a "container", which would serve as a content placeholder⁷ for the engine. The engine cloud is loaded inside this placeholder, allowing the participants to interact with the pedagogical agents when asked to initiate a talk. The container application was developed with the help of PHP Desktop⁸ that creates standalone containers for wrapping up the other applications.

The fourth tool was used for the development of the application's database that contained sets of possible sentence structures for the evaluation of speech acts produced by the participants. The tool was called phpMyAdmin⁹ that would allow for the creation of a local server and a database to which the tutorial could connect and compare the productions. Finally, a fifth third-party tool was required to integrate the animations, the recognition engine, and the database in a single, standalone software suite. SwishMax¹⁰, was a flash-based animation maker that was used for this purpose. It features the caliber to integrate multimedia materials into a coherent whole by allowing the developer to

¹ https://www.reallusion.com/iclone/download.html

² https://www.reallusion.com/iclone/mocap/download.html

³ https://developer.microsoft.com/en-us/windows/kinect/

⁴ https://www.reallusion.com/cartoon-animator/download.html

⁵ https://www.dummies.com/software/adobe/flash/how-to-create-a-motion-tween-in-adobe-flash-cs6/

⁶ https://www.mulesoft.com/resources/api/what-is-an-api

⁷ https://findanyanswer.com/what-is-a-content-placeholder

⁸ https://github.com/cztomczak/phpdesktop#downloads

⁹ https://files.phpmyadmin.net/phpMyAdmin/5.0.4/phpMyAdmin-5.0.4-all-languages.zip

¹⁰ http://www.swishzone.com/downloads/SetupSwishmax4.exe?af_id=

choose from among the pre-set stationary tools or to use coding and scripting via a dedicated built-in module. ActionScript¹¹, PHP¹², and Python¹³ were among the programming languages the researcher used in the development of the tutorial, which, in addition to the built-in tools, would allow the tutorial application to interact with the multimedia components.

The courseware comprised four modules representing the structure of the lessons on speech acts that were embedded in the tutorial application. The first module, the *Introduction Screen*, would prepare the participants in the experimental group for taking the lessons. Using a virtual tutor (i.e., Hamed), the application would first show the participants the video of two interlocutors, one native and one non-native speaker, interacting as well as the resentment that arose when the non-native speaker was unable to give the appropriate response. The agent would then explain the importance of learning how to use speech acts appropriately to the participants. For example, he would explain to the learners how to express regret, depending on the degree of formality and power relations, as well as how to make requests in a way that would seem less injurious to the addressee's personality and less imposing.

The second module, the *Presentation Screen*, would provide the participants with dialogues played out between two or more native speakers of American English where different types of speech acts would be introduced to express/respond to regrets, make/respond to requests, pay/respond to compliments, and so on, depending on the situation described. Two or more animated pedagogical agents would take the role of interlocutors in the presentation phase that would provide the participants with both explanations and examples of the types of acts being taught. The agents would first describe the situations in which the various types of speech acts could be used and then, through dialogues and conversations, they would model the practical, real-world situations in which the required acts could be properly used. Accordingly, what the students had learned from the introduction phase was also recycled in the presentation phase with the exception that the overriding aim here was to provide the learners with real-world examples of situations in which those forms could be appropriately used.

The third module was devoted to students practicing the speech acts in different situations. In this phase, however, no further explanations would be given and only one of the agents would initiate a dialogue with the participants. They then would have to complete the dialogue with the agent. The agent would indeed play the role of one of the interlocutors, encouraging the participants to provide him/her with appropriate forms of requests, compliments, or other forms. Using the speech recognition engine, the participants would talk to a lapel microphone, their speech would be parsed, and finally, the resulting output would be matched with appropriate sentence structures in the program's database. The participants would also watch an animation showing the consequences of their actions concerning their use of the speech acts as well as the linguistic forms they produced to realize them. In case the participants failed to give an appropriate response or to produce an appropriate linguistic form, a radio button with the caption reading "Model the conversation!" would appear on the screen where the same agent would initiate the same dialogue with a second pedagogical agent to model the conversation for the participants. The participants could watch the video of the agents

¹¹ https://help.adobe.com/en_US/as3/learn/as3_learning.pdf

¹² https://www.php.net

¹³ https://www.python.org/doc/essays/blurb/

modeling the dialogue twice. Then the radio button would be greyed out to control the amount of practice across individuals.

The fourth and the last module, *the Evaluation Screen*, likewise would provide the learners with opportunities to interact with one of the virtual tutors where the agent would mainly give directions to the learners on how to attempt different subsets of the posttest; however, unlike *the Practice Module*, here the agent would only monitor the participants' progress, and it would not give comments on the students' performance. In addition, before learners taking the quiz, sample test items would appear on the screen, showing the participants how to answer the items of the quiz. Using a built-in countdown timer, the application would also control the amount of time the participants could spend on the completion of the test.

In addition to the main instructional instrument employed in the present study, other devices were used for data collection and student measurement: A Cambridge IELTS proficiency test was used to select the participants of the desired proficiency level (i.e., intermediate EFL learners). Likewise, a survey questionnaire was used to elicit appropriate forms of speech acts from the native speakers of American English. The questionnaire (see the appendix for a sample copy) comprised a set of discourse completion tasks that described the situations in which the aforementioned types of speech acts could be used. Native speakers were required to supply the appropriate forms of speech acts concerning the specific situations demanding them. Their responses then served as a yardstick for generating dialogues that were used by both the researcher during teacher fronted instruction and the pedagogical agents in agent-based multimedia instruction. Existing conversation books such as Clockwise (2007), Interchange (5th ed., 2017), Face2Face (2nd ed., 2013), New Headway (4th ed., 2014), New Opportunities (2008), and New Snapshot (3rd ed., 2004) were also consulted, which served as a few fruitful sources for the introduction of different types of communicative acts and common expressions used in everyday communication.

To ascertain the participants' degree of familiarity with different forms of speech acts in situations where they could be properly used, a pretest consisting of 80 items was developed based on the native speakers' responses to the questionnaire items. The test items were available in different formats (e.g., classification, matching, multiple-choice, etc.). Each item correctly answered would receive a score of one mark, and the total possible score would be 80. A parallel version of the pretest with a different ordering of the items was also developed to serve as the posttest and to gauge the participants' degree of learning at the end of the experiment.

Procedures

At the beginning of the experiment, a sample copy of the Cambridge IETLS proficiency test was administered to a population of freshmen from whom a total of 120 EFL learners were randomly selected and assigned to two equivalent groups of participants. A digital randomizer called SuperCool Random Number Generator¹⁴ was used to randomly choose and assign the selected participants to study groups. To this aim, each member of the pool of qualified candidates was assigned a number that ranged from one to 120. The randomizer then randomly assigned the participants whose numbers fell

¹⁴ http://www.supercoolbookmark.com/download/supercoolrandom104.zip

within the first range of random numbers to the experimental group and those whose numbers fell within the second range to the control group.

Next, the two groups sat for a pretest of L2 pragmatic ability. They were assigned to classify, match, or choose appropriate forms of or responses to requests, apologies, compliments, as well as invitations concerning the situations demanding them. For example, one item would test what the participants would say in case they forgot to return their boss's expensive pen they borrowed the other day. The participants' answers were then compared with the native speakers' responses to the questionnaire items for the researcher to check how well they matched. They would receive one mark for the matched responses. Analysis of the participants' responses revealed that they delivered a lackluster performance on the test. This suggested that they would need to receive treatment concerning the aforementioned types of speech acts. In addition, the results showed that the two groups were homogenous, belonging to the same population at the beginning of the experiment.

The two groups then received treatment on English speech acts through either agent-based or teacher fronted instruction. As for the experimental group, the experiment was conducted at a computer lab equipped with cabins featuring acoustic walls so that while speaking to their lapel microphones, the students' voices would not get mixed. At the researcher's signal, all the participants would click on the application's icon to launch it on their systems. The program would first start with the Introduction Module where Hamed, the virtual tutor present in the tutorial, would embark on a thorough introduction to speech acts, explaining when it would be appropriate to use them, the types of language and sentence structures that would lend themselves to the contexts in which the communicative acts took place, the structure of the lessons, the functions of the buttons, and so on.

As for making and responding to requests, for example, the agent would explain that requests are of three types: direct, indirect, and hints and that direct requests are not commonly used by Americans, as they can be viewed as rude and impersonal. The agent would further explain that direct requests are used when an element of intimacy has entered the relationship between interlocutors or when there are unequal power relations where persons of higher social positions are entitled to make such direct requests of people in lower-power positions. Next, the agent would elaborate on indirect requests and hints, their discrepancies, as well as when they could be properly used. Following the agent's explanation, example sentence structures would also appear on the screen, and the participants could see when it would be appropriate to use each type of request as well as what linguistic structures would lend themselves to the situations described.

The second part of the Introduction Module was devoted to a discussion of how the perceived degree of imposition could play a role in the use of requests. Here the agent would explain that requests of something considered to be of particular importance by Americans, such as time or possessions, are perceived as very imposing and that the higher the degree of imposition and the formality of the situation, the more politely the request should be made. Here again, examples would be given where the participants could experience situations that ranged in the degree of imposition as well as encounter appropriate sentence structures that could be used in those settings.

Next, the agent would explain how individuals could modify requests through intensification and softening strategies. Here the agent would explain that intensifiers are usually used to increase the force of requests typically in situations when the person making the request is in a position of power higher than that of the person of whom the request is being made as is the case with the parent-child or teacher-student relationships. The agent would further add that there may be instances of upgrading between equals, like between siblings; however, this would not necessarily be indicative of good feelings between the individuals involved. On the other hand, the agent would explain that the speaker could use the softening strategies to decrease the force of requests in a way that would be less imposing on individuals. He would further explain that there are situations in which authority and social power are not equally distributed among individuals, but people of higher positions often need to soften their requests to establish rapport with the individuals with whom they are living or working. For example, the agent would explain that a boss could ask his/her assistant to bring him/her some papers, but (s)he does not want to sound too imposing, and hence (s)he would use softening strategies to make a more polite request of a person of equal or lesser power.

Chief among the types of softening strategies introduced by the agent were: (a) pre-compliments, where the person making a request first asks the requestee for his/her willingness to help, and if (s)he agrees to help, the person would make the request; (b) explanations, where the person making a request tries to justify the need for the favor; and (c) reward, where the requestor is sure that providing rewards could encourage the requestee to do what (s)he is asked to do.

As for responding to requests, the agent would explain that there are strategies for agreeing to requests or denying them. He would further add that since it is considered rude to simply deny requests in American English, it is customary to give an excuse or explain why we are denying requests, which can somehow soften the denial. He would then supply the participants with example sentence structures and expressions used to either grant requests or deny them. Figures 1 to 3 below show how the lifelike pedagogical agent explained the types of requests and furnished the participants with real-world examples of when and where to use each type:

Figure 1



The Introduction Screen

Note. The agent "Hamed" is explaining why resentment arises when requests are made inappropriately. He is also suggesting what should be done to soften the requests in a way that would sound less imposing.

Figure 2



Note. Hamed is talking about general types of requests. Examples would follow the introduction of each type.

Figure 3



The Introduction Screen

Note. Hamed is talking about the situations and occasions in which different types of requests could be used appropriately. Elaboration on usage was perceived to be as consequential as the linguistic forms used to realize speech acts.

Once the introduction to general types of requests was concluded, the instruction proceeded through the second stage characterized by the presentation of dialogues played out by two or more virtual characters. As discussed earlier, what the students had learned from the Introduction Module was also recycled in the presentation phase where one of the agents would first embark on a brief introduction to what went before and then initiate a dialogue with a second agent. The students could watch up to 4 dialogues where the agents would simulate real-world situations in which different types of requests could be made. The students were also required to pay close attention to the linguistic structures that were used in situations in which the requests were made. Figure 4 below shows a dialogue played out by two animated characters during the presentation phase of instruction:

Figure 4





Note. Two agents are playing out a dialogue showing how one can make a given type of request on a special occasion. Here it is shown that the girl is using one of the softening strategies (i.e., reward) to lessen the burden of the request she is making.

The presentation phase was then followed by a third and a fourth module where learners would be given opportunities to engage in interaction with a pedagogical agent, practice using appropriate forms of speech acts in different socio-pragmatic contexts, and finally, be tested on what they had learned through the previous phases of the lessons. Figure 5 below shows the Practice Screen for requests:

Figure 5 *The Practice Screen*



Note. The girl is initiating a dialogue with students. They should then press the record button for the speech recognition engine to record and parse their productions.

As can be seen in the figure, Hamed, one of the virtual tutors who also appeared in the Introduction Screen, would first give directions on how to practice using the speech acts with the pedagogical agents. He would explain that the participants could watch the results of their actions concerning their choices over the type of request or form of response they would use while practicing with the agents. In the example shown in the figure, in case the students, assuming the role of Professor Allen, did not provide Allice, the pedagogical agent assuming the role of a student, with an appropriate response to her request, the girl would become upset and the participants would then learn that their response had offended the virtual student. The agent would also add that the participants would be allowed to modify their responses, too, and in case they failed to provide an appropriate response to her request the second time, a radio button would pop up where the students could ask the agent to model acceptable sentence structures. The agent would also let the participants know they would need to talk to a lapel microphone for the embedded speech recognition engine to parse their voices. Once their voices were recognized and converted into stretches of connected texts, their responses would be compared to native-like responses stored in the application's database for the program to decide whether to move on or stay, thereby letting the participants practice further.

Once the students practiced the dialogues with the pedagogical agents, they were evaluated on what they had learned from the instruction via an evaluation module. The evaluation rubrics for requests were as follows: (a) the relationship between the participants (i.e., formal vs. informal/intimate); (b) perceived degree of imposition (i.e., highly imposing vs. slightly imposing); (c) type of language used, and (d) responding to requests. Accordingly, an analytic marking procedure was used to produce the participants' overall posttest score, which was an aggregate of all the points the students had obtained on each subset of the test. The posttest was a parallel version of the pretest with a different arrangement of the prompts, and like the pretest, it comprised 80 items that ranged in type from classification to multiple-choice and matching. Using ActionScript Programming and "shared objects" which act like "cookies" in HTML Programming, SAT would automatically track the students' progress and save their answers in a log file for later analysis. Figure 6 below shows the Evaluation Module for requests:

Figure 6



Note. Hamed is giving directions on how to attempt the test items. Sample items also popped up on the screen. As for classification items, the movement of a slider could help the participants indicate how imposing the request would be, depending on the situation described.

For both Practice and Evaluation modules, a built-in countdown timer would control the amount of time and practice spent on each item. As for the other types of speech acts, the same procedure was followed by the tutorial application: As for compliments, the lesson structure in the introduction phase consisted of: (a) reasons to use compliments in American English; (b) how to use compliments; (c) the language for compliments, and (d) responding to compliments. Likewise, the evaluation rubrics comprised: (a) the role of the relationships; (b) objects of compliment; (c) the type of language used, and (d) responding to compliments. For apologies, the introduction phase focused on: (a) when to apologize; (b) seriousness of the offense; (c) formality, and (d) variations in apologies. In a similar vein, the Evaluation Module comprised items that would assess the participants' ability to: (a) recognize situations demanding individuals to apologize; (b) recognize the degree of formality of the situations; (c) severity or seriousness of the offense, and (d) responding to apologies. Finally, as for invitations, the lesson content consisted of (a) an introduction to invitations; (b) elements of the invitation; (c) types of language and structures used for invitations, and (d) responding to invitations. The evaluation criteria would require analysis of (a) the role of the relationships; (b) an introduction to invitations; (c) the type of language used to realize invitations, and (d) responding to invitations.

As for the control group, the same procedure was followed except that here the researcher himself went through the introduction, presentation, practice, and evaluation phases in collaboration with the participants. First, the researcher provided the learners with explanations and reasons for paying compliments, expressing apologies, and so on in American English, followed by his elaboration on common expressions and structures used to realize the very types of speech acts. Next, in the presentation phase, the researcher first read a dialogue between two or more interlocutors with the participants. The participants were then given enough time to practice the dialogue in dyads. Afterward, the researcher initiated a different dialogue where he assumed the role of one character making requests or expressing regrets, paying compliments, and so on. He then asked the students to give an appropriate response depending on the situation in which the communicative act occurred. It was also required that the students shift their roles periodically when making requests, expressing apologies, paying compliments, or giving invitations.

The cycle continued until all four types of speech acts were introduced and practiced by the participants. The instruction was then followed by an evaluation phase which was much akin to that the experimental group went through; however, the control group sat for a paper test as opposed to their counterparts in the experimental group. While the countdown timer controlled the amount of time and practice for the experimental group, the researcher himself controlled the time spent on the test items as well as the amount of practice for the participants of the control group. To avoid tiring students, they got adequate breaks at regular intervals during different phases of instruction. The experiment lasted for four consecutive sessions and between 45 to 50 minutes per session. At the end of the experiment, the participants' profiles in the experimental group and the exam papers in the control group were analyzed, and their mean scores were obtained and subjected to a test of statistical significance. Figure 7 below summarizes the steps taken in the study.

Figure 7 *Steps Taken in the Study*



Note. The arrow keys show the steps taken in the present study. Shapes of the same color represent the events that happened in individual steps or the products of each sub-process.

Results

To analyze the participants' performance scores on measures of L2 pragmatic ability, independent samples and paired samples t-tests were employed using IBM Statistical Package for the Social Sciences (SPSS) Statistics (v27), a powerful statistical software suite. Tests of normality, as well as Quantile-Quantile (Q-Q) plots, were used as preconditions for running parametric tests. Table 1 below summarizes the results of the pretest of L2 pragmatic ability:

Table 1

Descriptive Statistics of the Pretest Scores											
Groups	Ν	М	SD	SE	95%	Minimum	Maximum				
					Lower Bound	Upper Bound					
Exp.	60	15.48	3.916	.506	14.47	16.50	8	24			
Ctrl.	60	16.47	3.149	.406	15.65	17.28	9	25			
Total	120	15.98	3.573	.326	15.33	16.62	8	25			

Note. Exp. = Experimental Group. Ctrl. = Control Group. The mean scores for both groups are below average on the pretest of L2 pragmatic ability.

As can be seen in the table, the participants performed close to each other, and their poor performance on the pretest is indicative of their limited ability before experimentation. Figure 8 below likewise graphically displays the difference between the pretest mean scores of the two study groups:







Note. The study groups' poor performance suggested that they would need to receive instruction on L2 pragmatic ability. In addition, they performed close to each other, which showed that they were almost at the same level of ability.

Table 2 below summarizes the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests as indices of normality:

Table 2 Tests of Normality Kolmogorov-Smirnov^a Shapiro-Wilk Groups Statistic df Sig Statistic df Sig 60 200* Exp 116 .960 60 245 Scores .975 60 200* Ctrl. 117 60 259

a. Lilliefors Significance Correction

Figure 9

Note. The results of the tests of normality suggest that the two study groups come from a population with a normal distribution of scores (p > 0.05).

As Shapiro-Wilk Test is generally considered to be more powerful in detecting departures from normality for small samples (n < 50), many scholars show a preference for reporting this measure of normality in their studies (Ogunleye et al., 2018; Yap & Sim, 2011). As can be seen, the probability value reported for this test is beyond the pre-set alpha value (p > 0.05), which suggests that the participants' performance scores did not greatly deviate from a normal distribution of scores. Further evidence supporting the tenability of such a claim comes from the results of the Kolmogorov-Smirnov Test, which clearly shows that the two samples were randomly chosen from a population with a normal distribution of scores.

Data from the same participants were also analyzed to produce a Q-Q plot that would allow for the graphical display of the results. Figures 9 and 10 below show the normal Q-Q plots of the pretest scores for both study groups:



Observed Value

Note. Most scores are very close to the diagonal line and do not seem to have a non-linear pattern.



Figure 10 *Normal Q-Q Plot of the Pretest Scores of the Control Group*

Once the normality assumption was satisfied, the pretest scores were subjected to a test of statistical significance to see whether the difference between the mean scores of the two study groups was statistically significant and hence meaningful. Table 3 below summarizes the results of the test of homoscedasticity, as well as those of an independent samples t-test reported for the pretest, mean scores:

Table 3

```
Results of the Independent Samples T-Test Reported for the Pretest Means
```

		Levene's Equal Varia	Test for ity of inces		t-test for Equality of Means						
		E	Sig	4	$_{\mu}$ Sig. (2- M SE	SE	95% CI				
		Г	Sig.	l	ај	tailed)	Difference	Difference	Lower	Upper	
Scores	Equal variances assumed	2.527	.115	- 1.516	118	.132	983	.649	-2.268	.301	
	Equal variances not assumed			- 1.516	112.795	.132	983	.649	-2.269	.302	

Note. The assumption of the equality of variances is justified (p > 0.05). The size of the between-subjects contrast is not statistically significant as suggested by the parametric test of statistical significance (p > 0.05); the groups belong to the same population.

As can be seen, the difference between the means on the pretest is not statistically significant (p > 0.05), which suggests that it is not sizable enough to claim that the groups' performance scores varied greatly at the beginning of the experiment.

Table 4 below reports on the performance of the study groups on the post-

Note. The data has a non-linear pattern; the scores form a normal distribution.

intervention measure of L2 pragmatic ability:

Table 4

Descriptive Statistics of the Posttest Scores											
Groups	Ν	М	SD	SE	95%	Minimum	Maximum				
					Lower Bound	Upper Bound					
Exp.	60	75.33	5.345	.690	73.95	76.71	65	80			
Ctrl.	60	63.12	6.491	.838	61.44	64.79	47	75			
Total	120	69.23	8.525	.778	67.68	70.77	47	80			

Note. Exp. = Experimental Group. Ctrl. = Control Group. Both groups made significant progress over the course of the study; however, the mean difference is in favor of the experimental group.

As can be seen in the table, both groups reaped a great gain throughout the experiment; however, the experimental group showed greater improvement in their command of English speech acts. The same results can be graphically shown in Figure 11 below:

Figure 11

Comparison of the Posttest Mean Scores



Note. The mean difference is in favor of the experimental group who obtained a higher mean score on the posttest of L2 pragmatic ability. The meaningfulness of the difference; however, is subjected to a test of statistical significance.

Yet, to ascertain whether the mean difference was statistically significant and hence meaningful, an independent samples t-test was employed for the analysis of the posttest mean scores. Table 5 below reports on the meaningfulness of the mean difference on the posttest:

Table 5

Results of the Independent Samples T-Test Reported for the Posttest Means

		Levene's Equal Varia	Test for lity of ances	t-test for Equality of Means						
		F	Sig	t	đf	Sig. (2-	М	SE	95%	6 CI
		Г	Sig.	ı	цj	tailed)	Difference	Difference	Lower	Upper
Scores	Equal variances assumed	.919	.340	$\begin{array}{c}11.11\\0\end{array}$	118	.000	12.233	1.101	10.053	14.414
	Equal variances not			$\begin{array}{c}11.11\\0\end{array}$	115.10 6	.000	12.233	1.101	10.052	14.414

Note. The homoscedasticity holds for the variances of the study groups (p > 0.05); however, the between-subjects contrast is statistically significant (p < 0.05), implying that the amount of gain is not comparable in size for the participants of the two groups.

As can be seen, the difference is statistically significant (p < 0.05) and large enough to be meaningful. The implication is that the two modalities of instruction had produced differential impacts on the students' learning of English speech acts, resulting in varying degrees of learning success.

Finally, one may look at Figure 12 below, which graphically shows the results of the pairwise comparison of the pretest and posttest mean scores for individual study groups:



Figure 12 Pairwise Comparison of the Mean Scores

Note. The means on the posttest clearly suggest that the participants' command of L2 pragmatic improved greatly over the course of the experiment; however, the amount of gain is not comparable in size, suggesting that the two groups' knowledge improved to a varying extent.

As can be seen in the figure, both groups progressed significantly throughout the study; however, the participants in the experimental group reaped a greater gain as a result of the instruction they received through the tutorial application.

Paired samples t-tests as measures of within-subjects effects likewise confirm the postulation that the amount of gain was statistically significant and hence meaningful. The results of these tests are summarized in Table 6 below:

Table 6

Results of the Paired Samples T-Tests

	Paired Differences							Si- (2
	M	<u>م</u> ع	SEM	95% CI		t	df	Sig. (2-
	IVI	SD	SEM	Lower	Upper			taneu)
Pair 1 Exp (Amount of Gain)	59.850	6.584	.850	58.149	61.551	70.412	59	.000
Pair 2 Ctrl (Amount of Gain)	46.650	6.972	.900	44.849	48.451	51.831	59	.000

Note. The probability values reported in the table are below the pre-set alpha value (p < 0.05); the amount of gain achieved by the participants of both groups is statistically significant and large enough to be considered meaningful.

As can be seen in the table, the amount of gain reported for the participants of both study groups is statistically significant (p < 0.05), which suggests that both types of instruction had proved beneficial in aiding learners to develop their L2 pragmatic ability, even though the participants of the experimental group made considerable progress compared to their counterparts in the control group.

Discussion

This research aimed to ascertain whether a conventional (i.e., teacher fronted) approach and an agent-based multimedia instruction would differentially impact students' learning of English speech acts in such a way as to privilege one group of participants over the other. The experiment revealed that participants who received treatment on the four types of speech acts through SAT obtained a comparatively higher mean score than did those who received the conventional treatment. One explanation for the higher utility of agent-based multimedia instruction is that pedagogical agents hold great promise to serve as effective attention grabbers, thereby focusing learners' attention on salient linguistic features and discourse paradigms of the ambient language (Hayashi, 2018). The potential of virtual tutors to serve as efficient attention-getting devices in multimedia settings can partly be ascribed to their ability to produce the persona effect which results from the presence of a lifelike, anthropomorphic agent who is assumed to exert a noticeable impact on learners' interactive experience. When interactivity is enhanced, learners are more likely to devote close attention and allocate greater memory capacity to information processing. Persistence in the working memory might, then, lead to a more efficient encoding of information, deeper, and hence more memorable learning experience (Doyle, 1999; FitzGerald, 2000). In line with this argument, Hongpaisanwiwat and Lewis (2003) contend that anthropomorphism can enhance the naturalness of interaction between pedagogical agents and learners through providing a live and dynamic depiction of human facial expressions that creates in learners the impression that it is virtually a human being with whom they are interacting (Carlotto & Jaques, 2016). This hallmark of lifelike-animated characters combined with features of a simulated learning environment where a virtual tutor mimics a human being and actually behaves like him may add to the novelty of the learning experience such that students' motivation

and attention are sustained, thus leading to more efficient learning, better memory, and hence greater performance on tests of socio-pragmatic knowledge (Davis, 2018).

A further explanation is an idea that inherent in multimedia instruction is the notion of multimodal pedagogy, where different media in the form of text, animation, audio, stunning visual effects, and so on are integrated into a single application and presented to learners all at once. Since information is presented through multiple modalities, there is a great likelihood that different memory modules are engaged. When different channels are addressed, information is organized more efficiently, the encoding occurs more effectively, and learning is enhanced accordingly. The idea seems to underpin Moreno and Mayer's (1999) modality principle where they argue that modality effect is produced when relevant information available in multiple modalities is delivered to learners simultaneously, engaging different memory modules. Since these modules work hand in hand, information processed in different channels may aid in deeper understating, more efficient storage, and better retrieval of the stored elements. Furthermore, likely, a single modality would not suffice to ensure efficient coding of information. One postulation, then, is that different learners reap benefits from different modes of presentation. Some learners, for example, may prefer visual over auditory presentation. For others, the reverse may be true. Still, others may benefit from both modalities. Studies (Babaie, 2010; Coccetta, 2018; Freeman & Beaver, 2018; Johnson-Glenberg, 2000; Reed, 2006; Schreiber & Verdi, 2003; Varol & Ercetin, 2016) have shown that when information is available in two or more modalities, learning is enhanced largely owing to *elaboration* and *association*.

As Paivio's (2007) Dual Coding Theory (DCT) suggests, our working memory consists of two main modules: visual and verbal. Visuals are stored as *imagens* in the visual module, whereas words and verbal information are stored as *logogens* in the verbal memory. Two major processes also take place within and between the two modules: the *referential connection* and the *representational connection*. The representational connection is established between some incoming stimuli and either logogens or imagens in the verbal and visual memory modules, respectively. Accordingly, seeing or hearing a term can evoke the corresponding representations from the two memory subsystems. In other words, the association that is formed between the stimuli and the representations can make them memorable. The association, nevertheless, is stronger when it is formed between the two memory modules. What is known as the referential connection is established between some imagens where the linked representations can become more elaborate and hence more memorable.

When applied to the findings of the present study, it can be contended that the presentation of the material available in the form of visual and verbal texts combined with stunning visual effects and aural input in the tutorial application might have created a richer context for more efficient learning to occur. As for the conventional method, too, the learning context was rich enough for successful learning to take place; however, the human teacher might not have been as capable as the multimedia courseware in producing a strong modality effect. One postulation is that material presented on sheets of paper may not be comparable to their multimedia counterparts, as a computer is comparatively more capable of producing high-quality material and presenting them through diverse modes of presentation. Stunning visual and transitional effects, parallel presentation, user-friendliness, and enhanced interactivity are but a few affordances offered by tutorial applications (Park et al., 2018). In sum, it can be argued that the quality of presentation,

in addition to presentation modality, may also play a role in the quality of information stored as well as the strength of associations that are formed within and between the working memory subsystems (Li et al., 2019). Future studies, however, may shed more light on the tenability of such claims.

Conclusion, Limitations, and Suggestions for Future Studies

The present study aimed to explore whether learning of the English speech acts by Iranian EFL learners would be differentially impacted when they received instruction from animated pedagogical agents in a multimedia tutorial application or through a conventional method. The results showed that compared to a mainstream approach characterized by a human teacher embarking on the teaching of speech acts in a typical classroom setting, a multimedia tutorial featuring lifelike pedagogical tutors offers greater potential for improving learners' command of L2 pragmatics largely thanks to their attention-getting caliber, the presence of a strong persona effect in the tutorial setting, and greater modality effect that results from the availability of information in multiple modalities. Mimicry of human behavior as displayed by pedagogical agents combined with the multimodal presentation of information is believed to be two major hallmarks of agent-based instruction that bring human-computer interaction to a new level that has novelty value and is almost unchallenged in terms of its great potential for augmenting students' learning experience.

This research also suffered from certain limitations: The sample of speech acts introduced to the participants in this study was limited to only four types. Undoubtedly, language can be used to serve a multitude of other functions or goals such as greeting, leave-taking, suggesting, promising, complaining, and so on. It would be interesting to know whether and how students' learning could be impacted when these other types of speech acts were introduced in a tutorial application featuring pedagogical agents modeling the use of the speech acts and a recognition engine that would give learners greater control over their productions, the application itself, and regulation of their learning. Of equal interest could be an examination of potential contributions of agentbased instruction to teaching speech acts in languages other than English as well as in countries where English is learned as a second rather than a foreign language. A triangulated study that would encourage researchers to replicate the present research in different cultures in which English is used in business and everyday life and that would allow for cross-comparison of the findings is highly recommended.

Variations in style, register, and educational background likewise could affect degrees of *native-speakerness* to serve as a dependable criterion in our judgment of what counts as correct, acceptable, or permissible in a particular culture. Although a great many natives whose responses served as the base teaching material in the present study were highly educated people, existing conversation books were also consulted to safeguard against this variation possibly affecting the authenticity and hence the applicability of the material. Care, however, should be exercised to select a rather homogenous sample of native speakers whose responses could then be reliably used in test items or as teaching material in classrooms or tutorial applications. Budget constraints, time limitation, and some other factors had kept the researcher from exploring the long-term effects, if any, of the two instruction modalities on the participants' learning, limiting the

experimentation period to four sessions only for each study group. Future studies can be longitudinal, spanning a few months to allow for a more thorough examination of possible sustained effects of the treatments. Last but not least, the possibility for gender moderating the treatment effects as a potential covariate as well as the way it could interact with either instruction modality to possibly privilege one gender over the other could be the foci of future studies.

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Appendix

Discourse Completion Questionnaire

Please specify your name: _____

Directions:

Dear Sir/Madam:

The following questionnaire is intended to serve as the main data collection instrument in a research study whose overriding aim is to explore the comparability of the effects of a conventional and the CALL-based instruction on the learning of speech acts among non-native speakers of English. Four major types of speech acts, including requests, apologies, compliments, and invitations are introduced through a series of lessons presented in the tutorial. Since authentic language material is of great consequence, your responses to the following items would serve as a dependable source for the preparation of the content of the lesson. Each of the following scenarios describes a situation requiring you to provide an appropriate response. Decide whether you would say something to make a request, express your regrets, pay or return compliments, or give invitations. Please kindly fill in the space provided and return the questionnaire at your earliest convenience.

Please kindly indicate what you would say in each of the following situations:

Scenario 1: You are trying to study in your room and you hear loud music coming from another student's room down the hall. You do not know the student, but you decide to ask him to turn the music down.

You would say

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Scenario 2: You are now shopping in a department store. You see a beautiful suit and want to see it. You ask the salesperson to show you the suit.You would say

.....

Scenario 3: You are now discussing your assignment with your teacher. Your teacher speaks very fast. You do not follow what he is saying, so you want to ask your teacher to say it again.

You would say

.....

Scenario 4: Your computer is down because of a virus. One of your teachers is very skillful in fixing computers. You know he has been very busy recently, but you still

want to ask him to fix your computer. **You would say**

.....

Scenario 5: You are a teacher. In class, the mobile phone of one of your students rings.You ask your student to turn off his mobile phone.You would say

.....

Scenario 6: You are watching a basketball game on TV in a public waiting area. A person you don't know comes and stands just in front of you blocking your view. You want to ask him/her not to block your view.

You would say

.....

Scenario 7: You are applying for a new job in a small company and want to make an appointment for an interview. You know the manager is very busy and only schedules interviews in the afternoon from one to four o'clock on Wednesday. However, you have to take the final- term exam this Wednesday. You want to schedule an interview on Thursday.

You would say

.....

Scenario 8: You are the owner of a bookstore. Your shop clerk has worked for a year, and you have gotten to know him/her quite well. It is the beginning of the semester, and you are very busy selling and refunding textbooks all day. Today you have a plan to extend business hours by an hour, though you know the clerk has worked long hours in the past few days. You ask the clerk to stay after store hours.

You would say

.....

Scenario 9: For the first time this semester, you are taking a mathematics course. You have had a hard time following lectures and understanding the textbook. A test is scheduled to be held next week. You notice that one student sitting next to you seems to have good background knowledge of math, and is doing well. Since it is the beginning of the semester, you do not know him/ her yet. You want to ask him/her to study together for the upcoming test.

You would say

.....

Scenario 10: Something is wrong with your computer, but you have to finish some homework which is due tomorrow. Your roommate has a computer, but he is also writing a course paper on his computer. His homework is due the day after tomorrow. You want to ask him to stop his work and let you use his computer to finish your homework first.

You would say

.....

Scenario 40: A dignified university professor has given a lecture at your university. You want to invite him/her to dinner. What would you say? You would say

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