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Cultivating L2 Pragmatic Comprehension through Computerized vs. Non-Computerized Instruction, Multiuser Virtual Environments (MUVEs) and Mobile Augmented Reality Games (MARGs)

Amir Shakouri ⓘD

Ph.D. Candidate of Applied Linguistics,
Imam Khomeini International University, Qazvin, Iran

Ali Malmir* ⓘD

Assistant Professor of Applied Linguistics,
Imam Khomeini International University, Qazvin, Iran

Rajab Esfandiari ⓘD

Associate Professor of Applied Linguistics,
Imam Khomeini International University, Qazvin, Iran

Abstract

Pragmatic comprehension is a central albeit under-researched dimension of pragmatic competence in which most EFL learners suffer from serious deficiencies; therefore, the current study was launched to compare the effects of the Non-Computer Mediated Instruction (NCMI) with Computer-Mediated Instruction (CMI), Multiuser Virtual Environments (MUVEs), and Mobile Augmented Reality Games (MARGs) on Iranian EFL learners' comprehension of English speech-acts. Moreover, this study attempted to cross-compare the effects of the implicit, explicit, and balanced combination of explicit and implicit instruction and synchronous vs. asynchronous CMI impacts on learners' speech-act pragmatic comprehension. Seven equal-size groups of 20 upper-intermediate EFL learners took part in this study. Three NCMI groups (implicit, explicit, and balanced explicit-implicit), two synchronous and asynchronous CMI groups (SCMI & ACMI), one MUVE group, and a MARG group were taught based on their assigned 10 two-hour sessions treatments. A validated listening pragmatic comprehension test was used as a pretest and post-test. Data analysis using one-way ANCOVA showed that the utilised MUVE (OpenSim) was more effective than other types of treatments for learners' pragmatic comprehension development, and both CMI and NMCI were better than the used MARGs (*Batman Bat-Tech Edition* and *Harry Potter-Wizards Unite*). Moreover, those explicit and balanced explicit-implicit interventions were significantly better than the implicit instruction. Finally, the SCMI could enhance L2 pragmatic comprehension significantly better than the ACMI. These findings pedagogically imply that the use of MUVEs, SCMI, and balanced explicit-implicit interventions can strengthen L2speech-act pragmatic comprehension.

Keywords: (Non)Computer-mediated instruction, MARGs, MUVEs, Pragmatic comprehension, Speech acts

*Corresponding author's email: malmir@hum.ikiu.ac.ir

INTRODUCTION

Pragmatic comprehension and production have been mentioned as the two required dimensions of an effective L2 pragmatic competence in the existing literature, which are inquisitively interrelated to each other, and achievement, on one dimension, is virtually impossible without the other (e.g. Bardovi-Harlig, 2013b; Barron, 2003; Corsetti, 2014; Kasper & Rose, 2002; Taguchi, 2008b; Taguchi, 2019; Taguchi & Roever, 2017). Such a co-lateral relationship between the comprehension and production of pragmatic knowledge has been emphasized by many pragmatics researchers (e.g. Félix-Brasdefer, 2007; Schauer, 2009; Taguchi, 2005, 2007). Ross and Kasper (2013) pointed out that despite its integral role and its centrality in pragmatic competence, pragmatic comprehension has been paid less attention to and investigated less in comparison to pragmatic production. According to Taguchi (2008c), this relative ignorance of pragmatic comprehension in the current research is partly due to the difficulties of conducting studies in this regard, which can be attributed to the unobservable and recondite nature of comprehension processes in the mind of learners, particularly the multilayeredness of the pragmatic comprehension processes. Taguchi and Yamaguchi (2019) commented that the internal complexity of this series of comprehension processes has been the origin of such negligence and less eagerness on part of the researchers to study pragmatic comprehension. In tandem with this, the development of instruments that can tap into the nature of pragmatic comprehension processes is a difficult enterprise which the current data collection procedures cannot aptly cope with (Félix-Brasdefer, 2008; Taguchi & Roever, 2017).

Despite the inherent difficulties in L2 pragmatic comprehension, some significant studies have been carried out about the nature of pragmatic comprehension and the use of instructional approaches and activities to enhance it in various EFL/ESL contexts (e.g. Lee, 2010; Taguchi, 2007,

2008a, 2008b, 2009; Takahashi & Roitblat, 1994) and the Iranian EFL context as well (e.g. Derakhshan & Eslami, 2015; Derakhshan et al., 2020; Malmir, 2020; Malmir & Derakhshan, 2020). Particularly, some researchers have argued that explicit and implicit instructions can also be effective in giving a boost to L2 learners' pragmatic comprehension (e.g. Derakhshan & Shakki, 2021; Rose, 2009; Taguchi, 2002, 2009). As mentioned by Taguchi et al. (2016), in contrast to the production of speech acts, implicatures, conversational routines, and other types of pragmatic knowledge, the effectiveness of the instructional activities for fostering pragmatic comprehension mostly has remained in the realm of theoretical speculations, and far less research has been conducted in this area.

The use of various computer and mobile-based technologies has turned out to be effective in strengthening the impact of explicit and implicit instruction for teaching L2 pragmatic knowledge to L2 learners (González-Lloret, 2008, Taguchi & Roever, 2017). A great deal of research has been conducted on technology-mediated pragmatic instruction, demonstrating the strength and effectiveness of CALL and MALL softwares and possibilities for increasing L2 learners' pragmatic knowledge (e.g. Bardovi-Harlig et al., 2015; González-Lloret, 2018, 2022; Sykes, 2018). Nevertheless, as stated by González-Lloret (2018), most of these studies have focused on the production of speech acts, implicatures, and other types of pragmatic knowledge, and the researchers of such studies had not embarked upon examining such technology-based instructions for enhancing L2 pragmatic comprehension capabilities. Sykes (2018) has called for more empirical studies on technology-mediated instruction particularly for enhancing L2 pragmatic comprehension.

Accordingly, the current study was conducted, in the first place, to fill in this research gap by comparing the effects of the NCMI with CMI, MUVEs, and MARGs, as three important technology-mediated types of instruction, on Iranian EFL learners' comprehension of English speech acts. The second purpose of the current investigation was to cross-compare the effects of the implicit, explicit, and balanced combination of implicit and

explicit types of NCMI on the participatory EFL learners' speech-act pragmatic comprehension. Finally, this study tried to examine whether the instructions given through synchronous computer-mediated instruction (SCMI) and asynchronous computer-mediated instruction (ACMI) as two important types of CMI had differential impacts on EFL learners' speech-act pragmatic comprehension.

LITERATURE REVIEW

The current literature review provides the available literature on pragmatic comprehension, and technology-mediated pragmatic instruction including computer-mediated instruction, MUVEs, and MARGs. Moreover, some of the related empirical studies will be briefly touched upon.

Pragmatic Comprehension

Pragmatic comprehension is the process of decoding the form of the target language to extract the intended meanings and functions based on the features of the sociocultural context (Taguchi & Roever, 2017). Such ability requires that L2 learners be able to understand the form-function-context mappings and decipher the sociopragmatic meanings, which are the most acceptable ones given the features of a specific context (Davis, 2007). Taguchi et al. (2013) expressed that for accurate pragmatic comprehension, L2 learners require to be aware not only of the meanings of words and sentences but also of the intended meanings of the speakers. Taguchi (2009) also stated that pragmatic comprehension goes beyond the locutionary meanings of the words and utterances since it requires the knowledge of illocutionary meanings, which are deeply rooted in the macro and micro sociocultural context of the conversational exchanges. According to Taguchi (2014), there is an essentially bilateral relationship between pragmatic comprehension and production because understanding the intended meanings of the other interlocutor is a prerequisite for formulating the sociopragmatic meanings in special pragmalinguistic forms.

From Garcia's (2004) point of view, pragmatic comprehension is the competency to understand an L2 message or utterance by using contextual features. Taguchi et al. (2013) considered pragmatic comprehension an interpretation of the pragmalinguistic forms using both contextual clues and sociopragmatic references. Contextual clues can be both external elements such as the setting and internal components like prior knowledge and experience (Loukusa et al., 2007). According to Perez (2017), internal, external, and cognitive factors can affect pragmatic comprehension in a sophisticated chain of mental processes. Pragmatic comprehension varies from linguistic comprehension because pragmatic comprehension utilizes both linguistic (structure and lexicon) and nonlinguistic information to convey the target meanings across (Ross & Kasper, 2013). Pragmatic comprehension makes use of not only pragmalinguistic but also sociolinguistic and contextual elements (Taguchi et al., 2013).

Bardovi-Harlig (2013a) held that pragmatic comprehension is the simultaneous connection between contextual features and the sociocultural components that is happening in the brain of L2 learners and has a myriad of cognitive, psycholinguistic, and sociolinguistic dimensions that are difficult to completely understand. Pragmatic comprehension is mainly built up of declarative knowledge of the common speech acts, different types of implicatures, conversational routines, and some interactional prefabricated patterns that are internalized during the pragmatic performance (Loukusa, et. al., 2007). According to Taguchi's studies (2007, 2008a, 2011), accuracy and speed are two indistinguishable levels of pragmatic comprehension. Accuracy means the knowledge of interpretation of the speakers' intended meanings in the target setting and speed or knowledge of processing refers to the speed of assigning and understanding pragmatic information.

Taguchi (2011) also reported that Anderson's (1993) Adaptive Control of Thought (ACT) model, which is a cognitive model of skill acquisition, contributes to distinguishing between accuracy and speed of pragmatic comprehension. Pragmatic comprehension is considered the processing of these two measures. Taguchi (2008b) made a distinction

between the subsidiary and lexical processings for pragmatic comprehension. She mentioned that the subsidiary processing involves executing meanings to spoken acts at a higher level but regarded lexical processing as lower-level processing in pragmatic comprehension. Taguchi (2007) found a significant relationship between the speed of lexical processing and the speed of reply in pragmatic comprehension and also between proficiency level and accuracy of pragmatic comprehension. The results of this study indicated that both pragmatic accuracy and speed improved significantly after seven weeks of treatment.

Despite its very important position within pragmatic competence, pragmatic comprehension has been investigated less in comparison with pragmatic production according to some outstanding pragmatics scholars (e.g. Bardovi-Harlig, 2013a; Barron, 2003; Kasper, 2001; Rose, 2009; Taguchi, 2019). Like the general pragmatics research, the first pragmatic comprehension studies were descriptive and cross-cultural that compared the recognition of various types of speech acts between the NSs and NNSs of the target language (e.g. Lee, 2010; Rose, 2000; Taguchi, 2008c). These descriptive pragmatic comprehension studies mainly noted some varieties between native speakers' pragmatic comprehension capabilities and non-native learners and suggested that L2 learners should be exposed to more target language input to acquire abilities like a native speaker (Lee, 2010). The goal of the studies, as suggested by Taguchi (2008c), was to strengthen the researchers and teachers' viewpoints toward learners' lack of efficiency and the existing gap in learners' pragmatic comprehension abilities and to customize their teaching activities in this respect.

The second generation of pragmatic comprehension studies were rather long-term investigations in academic settings that aimed at locating the development of pragmatic comprehension capabilities during study-abroad situations by L2 learners in the target L2 community (e.g., Bardovi-Harlig & Bastos, 2011; Schauer, 2009). The general finding of this group of studies based on Taguchi (2015) was that pragmatic comprehension abilities

developed gradually and incrementally and in line with the growth of L2 proficiency.

The third stage in L2 pragmatic comprehension research has delved into the instruction of pragmatic comprehension that attempted to develop L2 learners' pragmatic comprehension capabilities and their awareness of implicatures and speech acts, through numerous teaching practices and instructional activities (e.g., Birjandi & Derakhshan, 2013; Derakhshan & Shakki, 2020; Derakhshan et al., 2020; Sarani & Talati-Baghsiahi, 2017; Taguchi, 2007, 2008a; Taguchi, et. al., 2013; Taguchi, et. al., 2016). Taguchi (2017) pointed out that the main finding of this group of studies seems to be that explicit or direct instruction can assist L2 learners to develop better pragmatic comprehension abilities.

Pragmatic comprehension has been explored for different speech acts, implicatures, routines, indirectness, and intended meanings of speakers in some empirical studies (Birjandi & Derakhshan, 2013; Derakhshan & Shakki, 2020; Taguchi, 2007, 2011). However, many aspects of pragmatic comprehension are still comparatively less studied and rigorous research is required to cast light on these dimensions including the incremental nature of pragmatic comprehension development, processes and mechanisms of understanding various kinds of implicatures, conversational routines and other types of pragmatic knowledge (Bardovi-Harlig, 2015). The attempts for teaching pragmatic comprehension have, in fact, started in the late 1990s and this domain is still in its fledgling stages. According to Taguch and Roever (2017), almost 90 percent of the instructional studies conducted in the domain of pragmatics in various EFL/ESL contexts have focused on the production of various speech acts; therefore, these studies should also be replicated for pragmatic comprehension dimensions.

Taguchi and Yamaguchi (2019) claimed that the instruction of pragmatic comprehension skills needs the application of new teaching perspectives, innovative instructional beliefs, and practical techniques to revitalize L2 learners' pragmatic comprehension capabilities. Sykes (2018) offered that instructional activities for enhancing L2 pragmatic

comprehension skills that are delivered through various technological tools can be very helpful in comparison with the traditional non-technological practices. González-Lloret (2018) has also suggested that computer-mediated pragmatic instruction and other types of instruction that are delivered through computers, cell phones, virtual environments, and games can be very effective in enhancing L2 learners' pragmatic comprehension capabilities. Sykes (2005) advocated the motivating impact of CALL and MALL potentials for enhancing L2 pragmatic comprehension and emphasized the need for more empirical studies in this regard. In the next section, a brief review of the most important issues about technology-mediated pragmatic instruction will be reported.

Explicit vs. Implicit Pragmatic Instruction

Teachability/learnability of pragmatic knowledge is a very important issue in L2 pragmatics research. Although a small group of researchers think that pragmatic knowledge cannot be directly taught and is only acquired during the experience of learning a language specifically when the learner lives in the target language community (e.g. Garcia, 2004; Plappert, 2019), most of the pragmaticians have stated that pragmatic knowledge can and should be taught either explicitly or implicitly (e.g. Bardovi-Harlig & Bastos, 2011; Roever, 2012; Taguchi, 2015). Studies on the role of instruction in L2 pragmatic development try to answer several questions: (a) whether pragmatic features can be taught, (b) whether pragmatic instruction is essential and beneficial to learners, and (c) whether different ways of delivering instruction have different outcomes (Rose, 2005). In research on pragmatic instruction, factors shaping learners' pragmatic competence are also examined, including the level of proficiency, length of stay, pragmatic transfer, and educational environment (Taguchi, 2015).

Regarding the differences between implicit and explicit instruction of pragmatics, findings of several studies in various EFL/ESL contexts (e.g. Alavi et al., 2020; Derakhshan et al., 2021; Kasper & Roever, 2005; Li,

2012; Mohammad Hosseinpur & Bagheri Nevisi, 2018; Rose, 2005; Salimi & Karami, 2019; Sánchez-Hernández & Barón, 2022; Sarani & Talati-Baghsiahi, 2017; Tajeddin et al., 2012; Tateyama, 2001; Yang, 2006; Zand-Moghadam & Mohandes Samani, 2021) confirmed the effectiveness and superiority of explicit instruction on the acquisition of L2 pragmatic features compared to implicit instruction. Zand-Moghadam and Mohandes Samani (2021), for example, reported that information-gap tasks could significantly enhance EFL learners' pragmatic production and metapragmatic awareness in comparison with reasoning-gap, and opinion-gap tasks; however, there were no significant differences among the effects of these three tasks on learners' comprehension of implicatures. After a walk-through of the studies done on the explicit and implicit instruction of pragmatic components, Taguchi (2017) pointed out that explicit instruction can deliver higher pragmatic comprehension and performance than implicit instruction. Fordyce's (2014) study examined the impact of explicit and implicit treatment on Japanese EFL learners' use of epistemic stance markers, reporting far significant instructional effects for the participants who received explicit instruction.

The effects of two pedagogical interventions (explicit, and implicit) on L2 students' pragmatic awareness and pragmatic production were investigated by Alcón-Soler (2005) who found that both explicit and implicit instruction increased students' pragmatic awareness. However, explicit instruction offered greater advantages to the language learners in performing requesting strategies. Alcón-Soler's study (2015) also supported that explicit instruction of L2 speech acts was significantly better than implicit instruction. Félix-Brasdefer (2008b) also argued for the effective role of direct pedagogical instruction for enhancing speech act knowledge of L2 learners of Spanish in comparison with non-direct, explicit types of treatments. Kim and Taguchi (2015) reported that explicit instruction of pragmatic components using the principles of task-based language teaching could promote EFL learners' speech act and implicature knowledge specifically with those tasks whose complexity was appropriate for the

learners. Tateyama (2009) mentioned that explicit teaching of requests could help JFL learners acquire Japanese requests more deeply and extensively.

Taguchi (2017) has supported the supremacy of explicit instruction over implicit instruction for enhancing L2 pragmatic knowledge; nonetheless, she has reported that implicit instruction is also helpful specifically when it is done through study-abroad and immersion studies. She has stated that when L2 learners receive pragmatic input in quantities when they are in the target community, even the slightest degree of implicit instruction can help learners acquire pragmatic knowledge even more fundamentally than explicit instruction. Nonetheless, Taguchi (2019) has challenged the acceptance of the effectiveness of explicit instruction over implicit instruction and has criticized the shallowness of some of the empirical studies concerning the duration of treatments, types of instructional tasks and activities, and the used instruments for data collection. She has called for more comprehensive studies specifically qualitative and mixed-methods ones that deeply delve into the nature of pragmatic comprehension development. Then, she has mentioned that implicit versus explicit instruction need not be considered as two extremes of a continuum, rather they should be seen as complementary and accordingly, further research is required to compare a balanced combination of the two. Such an attitude about the necessity of more comprehensive and sophisticated studies using robust methodologies has also been echoed in other researchers' perspectives (e.g. Alcón-Soler, 2015; Gómez & Ede-Hernandez, 2021; Plonsky & Zhuang, 2019). Accordingly, the present study aims at comparing these three types of instruction, i.e. explicit, explicit, and balanced combination of the two with each other and also with some other types of computer and mobile-based types of instruction. Such an empirical comparison is specifically important for promoting pragmatic comprehension development which has been less studied so far.

Technology-mediated Pragmatic Instruction

The use of digital and technology-based tools in teaching pragmatics has been addressed from different perspectives since a couple of decades ago. More particularly, computer-mediated instruction (CMI), MUVEs, and MARGs have been used and studied, as important and, in certain instances, transformative technological tools. The three important technologies will be briefly described and their use in pragmatics research will be reported as well.

Computer-Mediated Instruction (CMI)

Computer-mediated instruction (CMI), also known as computer-mediated communication (CMC) systems or CALL, is the most frequently used computer-mediated possibility which allows L2 learners to communicate asynchronously and synchronously with one another in real-time that, in turn, can lead to more effective language learning and pragmatic competence development (Sykes & González-Lloret, 2020). Both synchronous computer-mediated communication (SCMC) and asynchronous-computer mediated communication (ACMC) have confirmed their value for enhancing L2 proficiency and other language skills (see Chapelle & Sauro, 2017).

Both types of SCMC and ACMC have shown their efficiency in improving pragmatic awareness and enhancing the development of pragmatic competence knowledge in a group of empirical studies (Abrams, 2008, 2013; Belz, 2007; González-Lloret, 2022; Li 2013; Sánchez-Hernández & Barón, 2022; Takamiya & Ishihara 2013). Sykes and Cohen (2006), for instance, developed a website that worked based on ACMC for teaching Spanish as an L2. Those learners who used this website could improve their knowledge of Spanish speech acts very drastically. The students could engage in authentic communication with their classmates, and they could reflect on their pragmatic production and comprehension during and after the sessions. Cohen and Ishihara (2005) redeveloped an SCMC for Japanese as an L2, further reporting the benefits of the SCMC for

increasing L2 learners of Japanese' speech act knowledge. Sykes (2005) discovered that students' text-based CMC used a broader range of more complicated tactics to decline an invitation than their oral CMC.

The majority of L2 pragmatic research on SCMC has concentrated on a significantly broader range of pragmatic features and speech acts (e.g. Cunningham, 2016, 2019; González-Lloret, 2022). Among these include the usage of discourse markers, mitigation devices, and interactional sequences. SCMC research on L2 pragmatics indicates that this mode of communication is influential in eliciting pragmatic functions and a variety of speech acts such as advice-giving, agreement and conformity with our interlocutor, organization of social talk repair sequences, and the use of jokes and humour (Sykes &González-Lloret, 2020).

Generally speaking, as mentioned by Sykes (2017) and Maa and Taguchi (2022), most of the computer-mediated pragmatic instruction studies that have used various forms of CMC in the design and methodology have reported beneficial impacts. Nonetheless, most of these CMI studies have focused on the production of speech acts and implicatures in the L2 and very few studies can be mentioned that have used the CMI for pragmatic comprehension of speech acts and implicatures. Filling this gap was the second purpose of the current study.

Multiuser Virtual Environments (MUVEs)

Multiuser virtual environments refer to online and internet-based conference/chat rooms that may be accessible by a group of learners and instructors alike on the internet. It is feasible to educate synchronously in these settings, where interactions occur live, and learners may listen to instructors and visual presentations while interacting with other learners through text or voice. All MUVEs are shown online in three dimensions, (3D) and applicants are depicted by changeable three-dimensional avatars that may interact with other three-dimensional avatars and do different tasks. Coffman and Klinger (2006) mentioned that utilizing 3D MUVEs in

education may establish a positivist learning environment in which students' communications and interactions with one another through avatar-to-avatar activities require them to solve problems independently. Dalgarno and Lee (2010) believe that 3D MUVEs provide spatial knowledge which contributes to providing chances for internalizing contexts or experiential learning, designing authentic learning environments, and providing a rich learning experience that increases students' participation and motivation and includes more effective collaboration. Additionally, students are encouraged to participate actively and learn from experience through the use of practical activities (Coffman & Klinger 2008). Duncan et al. (2012) argue that 3D MUVEs contain learning and teaching activities such as collaborative simulations, inquiry-based learning, problem-based learning, role-playing, game-based learning, virtual quests, design courses, language teaching and learning, collaborative construction, virtual fieldwork, virtual laboratories, and participating in courses.

The educational potentials of the MUVEs such as establishing a free setting for learning, extending social collaborations and interactions, supporting learning through involvement in the authentic learning, enhancing students' motivation, collaboration, engagement, and communication, facilitating deeper learning by incorporating simulations of activities that are hard to duplicate in the real environment, and enabling learners to communicate with one another through voice chat, text, or certain animation motions have made them very valuable technology-based environments for L2 learning and teaching based on some empirical studies (Canto et al., 2014; Sydorenko et al., 2018; Sykes, 2009). This group of studies have used various MUVEs for enhancing different language skills and sub-skills, mostly reporting effective influences and significant improvements. However, the use of the MUVEs in L2 teaching and learning is less extensive in comparison with their use in general education. The use of the MUVEs for L2 pragmatic instruction is even more limited and comparatively little research has been done in this regard and what has been mentioned for the effectual features of the MUVEs for enhancing L2

pragmatic knowledge are scholarly hunches that are not supported by empirical data and only a few studies can be mentioned in this regard (e.g. Blattner & Fiori, 2011; Hellermann et al., 2013; Sykes, 2010; Sykes & Dubreil, 2019; Taguchi et al., 2017).

Pojanapunya and Jaroenkitboworn (2011), for example, investigated how Thai students of English generated concluding sequences in Second Life (a popular MUVE). Although students interacted through avatars and were not concerned with face-saving, they regularly engaged in preclosing activities (e.g., notifying of the need to go, agreeing on future meetings) prior to concluding the sequence by saying goodbye. That is, students transplanted pragmatic features from the actual world to the virtual environment. This shows that virtual settings may be used to replicate face-to-face interactions and serve as practice areas. Hellermann et al. (2013) also investigated how students interacted and managed their conversations using a special MUVE played through smartphones. They reported very slight speech act gains for L2 learners who participated in the study and suggested that the MUVEs lack the authenticity and naturalness of the real-world conversations that are full of pragmatic exchanges. Again, like the CMI pragmatic instruction, these previous studies on the MUVEs have mostly been carried out for speech acts and some general and pragmatic features, and to date, no previous study can be mentioned which has used the MUVEs for enhancing L2 pragmatic comprehension of speech acts and implicatures, the third research gap the current study is going to fill.

Mobile Augmented Reality Games (MARGs)

Mobile augmented reality games (MARGs) have been defined as those virtual interactive games that can be played using cell phones or tablets, which encompass the performance of game contents in the form of scripts, 2D or 3D graphics, audios, or even videos (Craig, 2013). The MARGs have proved their learning effectiveness reported by many empirical studies in general education (e.g. Costa et al., 2020; Koutromanos et al., 2015; Laine,

2018; Pombo & Marques, 2021) and L2 instruction as well (e.g. Godwin-Jones, 2016; Holden & Sykes, 2011; Liu et al., 2013; Sydorenko et al., 2019; Taskiran, 2018; Teo et al., 2022). Researchers have advocated the important features of MARGs for second and foreign language learning such as enhancing L2 learning motivation (e.g. Taskiran, 2018), increasing L2 learners' willingness to communicate (WTC), promoting the collaboration and cooperation during the process of learning with other game players who are mostly their peers and classmates (Sydorenko et al., 2019), boosting learners' autonomy and independence learning the language that is required for playing those games (Tang & Taguchi, 2020), combining the inside and outside classroom practices in a very effective flipped/blended fashion, and providing a nonthreatening environment that adds pleasure and consent to learning (Liu & Tsi, 2013).

The MARGs have been mostly used for enhancing L2 oral skills including speaking, listening, and WTC and to a lesser degree to vocabulary, grammar, reading and writing (e.g. Liu & Tsi, 2013) development. Nearly all of the existing literature on the use of the MARGs in L2 instruction have emphasized the significant contribution of such games; nonetheless, the application of the MARGs to L2 pragmatic instruction in robust studies is very rare and a handful of studies can be mentioned in this regard (e.g. Holden & Sykes, 2013; Reinhardt & Sykes, 2014; Sykes, 2009, 2014). Sykes (2009), for example, used two types of MARGs to teach the speech acts of requests and apologies in Spanish as a foreign language. This study reported that the used games could relatively enhance L2 learners' pragmatic performance; nonetheless, due to the artificiality of the games, the students could not generalize their learnings to authentic real-world conversations. Moreover, students could learn L2 Spanish requests better than apologies, demonstrating that the systematic focus on the form was required for teaching more difficult and incongruent speech acts. Sykes' (2013) study showed that the use of games for enhancing L2 pragmatic knowledge was effective with regard to the sociocultural aspects rather than the sociopragmatic dimensions. Holden and

Sykes (2013) developed a mobile video game called Mentira to implicitly teach agreement, refusal, and apology speech acts to L2 learners of Spanish as a foreign language while they were playing a game to solve a murder mystery. The game required extensive interaction between the students and entailed the use of the above-mentioned speech acts. Learners faced gameovers or blockades if they could not interact with each other and the game characters pragmatically. The efficiency of the game was assessed through observations, interviews and feedback from the participants, revealing that although some improvement was witnessed in participants' speech-act knowledge, pragmatic knowledge was subtler for the learners to acquire from the game. Accordingly, Holden and Sykes (2013) suggested more learner-friendly games for acquiring pragmatic knowledge based on learners' interests and favourite types of pragmatic encounters. Reinhardt and Sykes (2014) also highlighted the need for developing MARGs which are in line with participants' conversation and discourse interests.

This rarity of empirical studies on the use of the MARGs for enhancing L2 pragmatic comprehension is even more severe and only a few studies can be mentioned in this regard (e.g. Holden & Sykes, 2011). Moreover, these studies only have tried to use the MARGs for teaching one or two speech acts that have been assessed by tests with few items and limited sample sizes. These glaringly obvious shortcomings in the current pragmatics research prompted the current study to investigate the impact of the MARGs on speech-act pragmatic comprehension using larger sample sizes and validated pragmatic comprehension instruments.

PURPOSE OF THE STUDY

Specifically, this study aims at answering these research questions:

1) Are there any significant differences among the effects of non-computer-mediated instruction (NCMI), computer-mediated instruction (CMI), multiuser virtual environments (MUVEs), and mobile augmented reality games (MARGs) on Iranian EFL learners'

speech-act pragmatic comprehension?

2) Are there any significant differences among the effects of implicit, explicit, and balanced combination implicit-explicit types of NCMI on Iranian EFL learners' speech-act pragmatic comprehension?

3) Are there any significant differences between the effects of two types of CMI, including synchronous computer-mediated (SCMI), and asynchronous computer-mediated instruction (ACMI) on Iranian EFL learners' speech-act pragmatic comprehension?

METHOD

Participants

A sample of 140 male and female upper-intermediate EFL learners participated in this study. The learners' proficiency level was checked based on their scores on the Michigan Test of English Language Proficiency (MTELP). They had been learning English for two to five years at a private language institute in Lahijan, Gilan. These 140 students were randomly divided into seven equal-size groups of 20. Afterwards, the seven groups were randomly assigned into seven different instructional groups: three NCMI treatment groups (implicit, explicit, and balanced combination of implicit-explicit), two CMI groups (SCMI & ACMI), one MUVE group, and a MARG group. The age of the participants varied from 14 to 35 ($M=$ 22.5, $SD=$ 3.2), and their mother tongues were mostly Persian with some Gilaki and Taleshi dialects and rarely Turkish and Kurdish languages. They were from different socio-cultural strata and their educational degrees (high school students, high school diploma, BA/BS, MA/MS and rarely PhD) and their study majors varied.

Instrumentation

Two data collection instruments including a Michigan Test of English Language Proficiency (MTELP) and a speech-act comprehension test were

used in this study.

The Michigan English Placement Test

In order to select a homogeneous sample with regard to the English language proficiency level, a Michigan Test of English Language Proficiency comprising 80 multiple-choice items was used. The used MTELP included 40 grammar items, 40 vocabulary items, and three reading texts, including 20 questions. The speaking (section 4), and writing (section 1) sections were excluded due to logistic considerations, lack of qualified raters, and other impracticalities. The students whose scores fell between 31 and 45 and based on the rubrics of the test could be considered assessed upper-intermediate proficiency level students were accepted into this study.

Pragmatic Listening Comprehension Test

To assess learners' pragmatic comprehension, a pragmatic listening comprehension test developed by Birjandi and Derakhshan (2014) was used. This test consists of 25 conversations, eight conversations presenting speech act of apology, eight conversations containing request speech act, and nine conversations involving refusal speech act. Each conversation was followed by eight items three of which measure metapragmatic comprehension ability, one assessing sociopragmatic comprehension capability, three others gauged pragmalinguistic ability, and the last one the total pragmatic comprehension of the target speech act with regard to its illocutionary meaning. The test developers reported a reliability index of $\alpha = .82$ for this test. Since just one answer was considered the correct answer, correct responses and incorrect ones were assigned 1 and 0, respectively. Therefore, the highest possible score on this test was 200. To reliability of the test in the current study was $\alpha = .80$ which is good enough based on Field (2018).
Materials

The instructional materials consisted of scenarios and authentic oral interactions between the native speakers of the English language. For each

speech act, at least 10 scenarios were selected. The scenarios were selected through either electronic textbooks or non-electronic sources such as hard copy textbooks all with related audio files. The relevance of the scenarios was assessed by the researcher's supervisor professor. To avoid any pragmatic misunderstanding and cross-cultural conflicts, only the scenarios produced by native speakers of American English were used. The selected scenarios were taught to the participants of the study through the seven types of treatments which are depicted in the next section.

Procedure

A sample of 140 intermediate proficiency EFL learners, who were randomly selected and divided into seven study groups, took part in this study. As aforementioned, the assignment of these seven groups to the nontechnology and technology-mediated types of instructions was also done randomly. Before the initiation of the treatments, the pragmatic listening comprehension test was given as a pretest to check the participants' pragmatic comprehension of the English requests, refusals, and apologies including the required sociopragmatic and pragmalinguistic knowledge. The seven types of instructions were given as follows.

The first three groups were taught in traditional face-to-face classes and the used materials were books and whiteboards. In these three NCMI groups, no other technologies were used. Group A received implicit NCMI instruction, that is, the teacher implicitly taught the target speech acts to the students without directly raising the language learners' awareness about the structure and type of each speech act or mentioning the likely differences between the forms and functions of each speech act in L1 and L2. The focus of the teacher was mostly on the exchange of the meanings and flow of the communication. The teacher never stopped to give information about the pragmalinguistic features and sociopragmatic aspects of the speech acts that were present in the practice conversations. It was assumed that the students could absorb the pragmatic knowledge themselves.

Group B received the explicit NCMI instruction and the teacher explicitly taught speech acts to the students and raised the learners' awareness of the pragmalinguistic representations and the sociopragmatic norms of each speech act. Furthermore, the teacher gave information about the differences and similarities between the forms and functions of each speech act in L1 and L2. Before, during, or after the conversations, the teacher provided pragmatic information about the illocutionary forces behind each speech act, the linguistic aspects, and the sociocultural dimensions. The students could ask their questions and the teacher provided the required answers.

Group C learners were taught through a balanced combination of implicit and explicit NCMI instruction. In line with this, the class time was divided into two parts. In the first part of each class, the teacher worked on some conversations that included the target speech acts and the students were required to take part in the conversations similar to the main conversations with their classmates and exchanged their intended meanings using the target speech acts. The main focus was on the flow of the conversation and the teacher indirectly helped students to produce their own conversations to express the functions that were intended. During the second part of the class, the teacher specifically talked about the name of the speech acts, sociopragmatic norms and requirements, and pragmalinguistic forms of the target speech acts. Moreover, some meta-pragmatic awareness and cross-cultural information were given to the students. Students could also compare and contrast the types of speech acts between English and Persian and they could exchange their opinions in this regard.

Groups D and E received their constructions through laptop computers, tablets, or smartphones. Group D received instruction through SCMI. Adobe Connect and Skype and in a few sessions Moodle were used for conducting the SCMI. The reason for choosing Skype and Adobe Connect to deliver SCMI pragmatic instruction was that they were free, easy to use, and efficient in second language teaching based on the existing literature. The teacher first delivered the video or the audio that included the

target speech acts and then the students were required to act out the conversations in pairs or groups. All students should engage in conversations that entailed the use of the target speech acts. The teacher was mostly a coordinator and a monitor. The students were also permitted to show their own role-plays for the target speech acts based on the capabilities of the used SCMI that led them to be presenters or hosts. The teacher provided feedback on students' performances. The teacher tried to also use explicit instruction of the target speech acts using previously developed PowerPoints, video and audio excerpts, pictures and caricatures.

Group E received instruction through ASCMI. The participants of this group received their instructional materials through audio, video, and text messages using WhatsApp, Telegram, and Email. The teacher sent the previously developed materials in the format of PowerPoint that included conversations with pictures and audios/videos to the students through WhatsApp and telegram groups. The students had to completely read, listen to, and/or watch the sent materials and practice them. The students were required to make their conversations and instances of a specific speech act based on imaginary situations and then to send these conversations to the teacher and classmates by typing them, taking photos of their own handwriting and drawings, and acting out the conversations of the speech acts in the audio and video formats in pairs. The students could read, listen and watch the conversations from other classmates or groups and comment on them. The teacher answered students' questions and commented on their uploaded conversations. The students were required to be active in the designed telegram or WhatsApp group for two hours at least during each session.

Group F learners received their instruction through the OpenSim (version 2018) as the utilised MUEV. The teacher and the students interacted with each other through the OpenSim as a 3D-MUEV. The syllabus designed for the determined speech acts was delivered through the OpenSim. OpenSim was first installed on this group's participants' laptops, tablets, and smartphones with the help of two friends who were software

engineers and game designers. This team helped to incorporate the required conversations that included the target speech acts into OpenSim. Designing the syllabus for the used MUVE was a very sophisticated job that lasted for two months. OpenSim is a collaborative multiuser environment that is reliant on text, picture, audio and video files and can be modified for educational purposes. It is very interactive and students can exchange opinions and attitudes about a specific topic simultaneously. The scenarios for speech acts were programmed under the supervision of the researchers and two experts in educational technology who had worked with MUVEs.

Group G received their instruction through two MARGs. *DC: Batman Bat-Tech Edition* (2019 version) and *Harry Potter: Wizards Unite* (2019 version) were the two mobile augmented reality games (MARGs) that were used in the current study. These two MARGs were used based on the comments received from the participants in this group about their likes and dislikes toward the top 20 MARGs that were free, popular, user-friendly and could be easily installed on students' mobile phones, tablets, and laptops. Both of these MARGs required all the group participants to engage in the games at the same time.

Batman Bat-Tech Edition is rather a short game that hinges around ten adventurous missions, and ten mini-games. These missions and games require encounters among the players and the game characters based on the input from the players that is received through the camera and other video capabilities. Playing games entails some pragmatic exchanges among the players. *Harry Potter-Wizards Unite* has the same mechanism and plots a story that is based on some of the events in the famous storybook 'Harry Potter's series. This game is even more replete with conversations that require pragmatic exchanges. Nonetheless, changing the basics of the two games and incorporating the target speech acts in these games was very difficult; accordingly, some adjunct conversations were added with the assistance of the two game experts who were software engineers and game designers themselves. They altered the conversations to include some of the target speech acts in a very natural way that the players could not separate

from the context of the game. These changes were done two months before the treatments. During the sessions, the researcher and the two game and technology experts were present in the game and also in the WhatsApp group designed to help students overcome their technical problems in this regard. Furthermore, after each session of game-playing, the researcher provided some explicit information about the target speech acts on the WhatsApp channel for the students.

It should be noted that the first researcher was the teacher in the technology-based classes, i.e. the CMI (ACMI & SCMI), MUVE, and MARG classes; however, the three NCMI classes were handled by a PhD student of applied linguistics whose area of interest and research was pragmatics and had been completely briefed about the purposes of this study and how to teach in these three classes. He was in constant contact with the lead researcher during the treatments from the beginning to the last session. It should be mentioned that the students engaged with the designed activity/activities for relatively the same amount of time in each group, i.e. the time on task was somehow the same for the study groups. After 10 two-hour sessions, all seven groups received the pragmatic listening comprehension post-test.

Data Analysis

Because in each question, there was one independent variable, i.e. treatment group (with at least two groups), a posttest (pragmatic comprehension scores after the treatments), and a pretest (pragmatic comprehension scores before the treatments) as a covariate, one-way analysis of covariance (one-way ANCOVA) was employed three times separately for answering the three research questions.

RESULTS

Descriptive statistics for the main groups and their subgroups' scores on the pragmatic comprehension test can be seen in Table 1 below. As seen in

Table 1, before the treatments, the study groups and their subgroups gained rather similar means (*range*= 2.7) and SDs; nonetheless, they obtained higher mean scores on the posttest.

Table 1. Descriptive Statistics for the Study Groups and Sub-groups' Scores on the Pragmatic Comprehension Test

Groups	N	Pretest Mean	SD	Posttest Mean	SD
NCMI	60	82.40	12.05	124.22	12.90
Implicit NCMI	20	83.35	12.84	118.15	12.13
Explicit NCMI	20	81.45	12.09	126.10	12.20
Balanced NCMI	20	82.40	11.74	128.40	12.66
CMI	40	81.98	12.32	127.07	14.55
SCMI	20	83.05	11.28	133.25	13.13
ACMI	20	80.90	13.49	120.90	13.49
MUVEs	20	81.95	13.89	137.20	13.69
MARG	20	83.60	12.48	117.05	12.71

Furthermore, there were larger differences in their posttest scores. Before using the inferential statistics to check such significant differences in posttest scores, the use of the Kolmogorov-Smirnov normality test verified the normality of the distributions for the scores obtained by the main study groups and their subdivisions on the pragmatic comprehension test ($p> .05$ in all cases). Besides the normality, the absence of outliers and the pre-measurement of the covariate that were verified, the specific assumptions for running one-way ANCOVA including the absence of univariate and multivariate outliers, homogeneity of variances, and linearity and homogeneity of regression slopes (Field, 2018) were also confirmed while answering each of the questions as follows.

Research Question One

The purpose of the first research question was to scrutinize if there were significant differences among the effects of non-computer mediated instruction (NCMI), computer-mediated instruction (CMI) Multiuser Virtual

Environments (MUVEs), and mobile augmented reality games (MARG) on Iranian EFL learners' speech-act pragmatic comprehension. As displayed in Table 1, the mean score for the MUVEs Group ($M = 137.20$, $SD = 13.69$) was noticeably greater than the mean scores obtained by the other three groups i.e., CMI ($M = 127.07$, $SD = 14.55$), NCMI ($M = 124.22$, $SD = 12.91$), and MARG Groups ($M = 117.05$, $SD = 12.71$) on the pragmatic comprehension posttest. Figure 1 shows that the groups' means are comparatively similar on the pretest; nevertheless, on the posttest, the mean for the MUVEs Group is the greatest, followed by the CMI, NCMI, and then MARG Groups' mean scores.
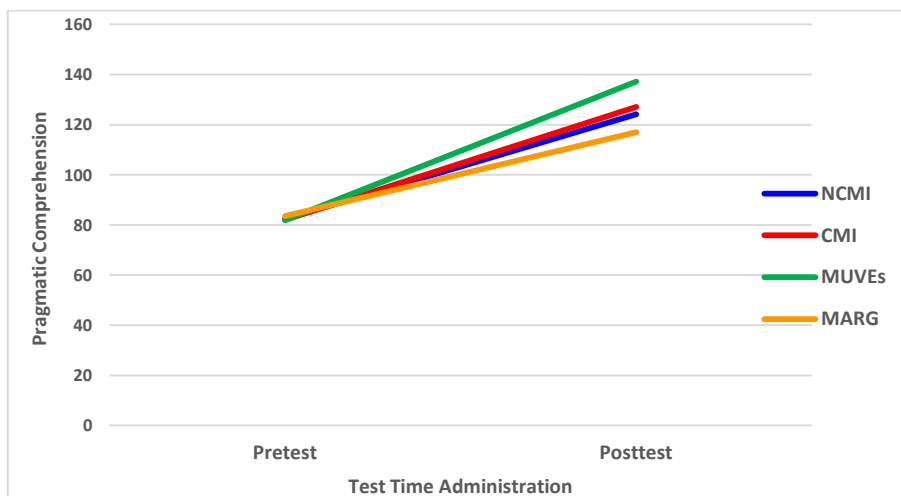

Figure 1. The NCMI, CMI, MUVEs, and MARG groups' means on the pragmatic comprehension test

Before running the one-way ANCOVA, Levene's test indicated the availability of the assumption of the homogeneity of variances ($F_{(3, 136)} = 1.12$, $p=.34 > .05$). Besides, the homogeneity of the regression slopes was not violated because the interaction between the covariate scores and the independent variable was not significant ($F_{(3, 132)} = 2.13$, $p= .09 > .05$). The

linear relationship between the pretest and posttest pragmatic comprehension scores was also proved ($F_{(1, 93)}$ = 34.55, $p < .05$).

As summarized in Table 2, the one-way ANCOVA detected a statistically significant difference among the NCMI, CMI, MUVEs, and MARG groups' speech-act pragmatic comprehension scores on the posttest ($F_{(3, 135)}$ = 11.42, $p < .05$, $p\eta^2$ = .20).

Table 2. The ANCOVA Results for the NCMI, CMI, MUVEs, and MARG groups' Scores on the Posttest

Source	SS	df	MS	F	p	$p\eta^2$
Pretest	6173.53	1	6173.53	44.92	.000	.25
Group	4712.32	3	1570.77	11.42	.000	.20
Error	18553.57	135	137.43			
Total	2246927.00	140				

Moreover, the scores obtained on the pretest significantly affected the speech-act pragmatic comprehension scores gained on the posttest ($F_{(1, 135)}$ = 44.92, $p < .05$, $p\eta^2$ = .25, indicative of a moderate effect size). The pairwise comparisons were made to investigate the precise differences between each possible pair of groups, the results of which are summarized in Table 3.

Table 3. Pairwise Comparisons for the NCMI, CMI, MUVEs, and MARG groups' Scores on the Posttest

(I) Group	(J) Group	MD (I-J)	SE	P
MUVEs	NCMI	13.22*	3.02	.000
	CMI	10.13*	3.21	.002
	MARG	21.04*	3.71	.000
CMI	NCMI	3.08	2.39	.199
	MARG	10.90*	3.21	.001
NCMI	MARG	7.81*	3.02	.011

The pairwise comparisons indicated the MUVEs Group significantly outdid the other three groups including the NCMI (MD = 13.23, $p < .05$), CMI (MD = 10.14, $p < .05$), and MARG Groups (MD = 21.04, $p < .05$). Furthermore, the CMI (MD = 10.90, $p < .05$) and NCMI (MD = 7.81, $p <$

.05) groups significantly outperformed the MARG group on the same posttest; however, no significant difference was located between CMI and NCMI groups ($MD = 3.08$, $p = .199 > .05$).

Research Question Two

The second research question explored if there were any significant differences among the effects of implicit, explicit, and balanced combination implicit-explicit types of NCMI on Iranian EFL learners' speech-act pragmatic comprehension. As demonstrated in Table 1, the mean score for Group C learners who received the balanced combination of the implicit and explicit instruction ($M = 128.40$, $SD = 12.67$) is strikingly larger than the mean scores obtained by the Groups A and B who received the explicit ($M = 126.10$, $SD = 12.20$) and implicit pragmatic instruction ($M = 118.15$, $SD = 12.14$). Figure 2 indicates such differences vividly:
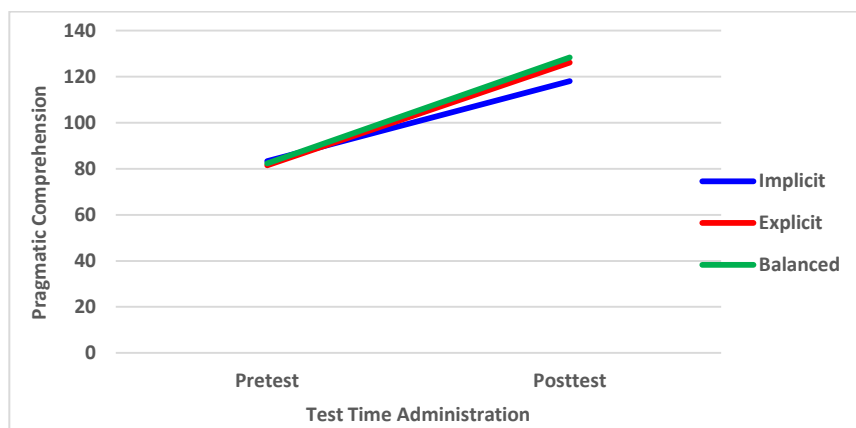

Figure 2. The impact of the implicit, explicit, and balanced implicit-explicit types of NCMI on the posttest scores

First, ANCOVA assumptions were checked as follows. Levene's test confirmed the homogeneity of variances requirement ($F_{(2, 57)} = .038$, $p=.09 > .05$). The homogeneity of the regression slopes was also met since the

interaction effect between the covariate scores and posttest scores was insignificant ($F_{(2, 54)}$ = .077, p= .92 > .05), and finally there was a linear relationship between the pragmatic comprehension scores before and after the treatments ($F_{(1, 25)}$ = 5.87, p < .05). As represented in Table 5 below, after controlling for the impact of the speech-act pragmatic comprehension scores on the pretest, significant differences were detected among the three NCMI groups' speech-act pragmatic comprehension scores on the posttest ($F_{(2, 56)}$ = 4.53, p< .05, $p\eta^2$= .14, suggestive of a rather low to mediocre effect size).

Table 4. The ANCOVA Results for the Implicit, Explicit, and Balanced Implicit-Explicit NCMI groups' Scores on the Posttest

Source	SS	df	MS	F	p	$p\eta^2$
Pretest	917.23	1	917.23	6.62	.013	.10
Group	1256.85	2	628.42	4.53	.015	.14
Error	7757.91	56	138.53			
Total	935619.00	60				

In addition, Table 4 indicated that there was a strong relationship ($F_{(1, 56)}$ = 6.62, p < .05, $p\eta^2$= .10) between the pre-intervention and post-intervention scores on the total speech-act pragmatic comprehension. In other words, the speech-act pragmatic comprehension scores obtained on the pretest before the given treatments significantly affected the speech-act pragmatic comprehension scores gained on the posttest. The pairwise comparisons were conducted to find out where the exact differences existed between each possible pair of groups' pragmatic comprehension scores (Table 5).

Table 5. Pairwise Comparisons for the three NCMI groups' Scores on the Posttest

(I) Group	(J) Group	MD (I-J)	SE	P
Balanced I-E	Implicit	10.56*	3.72	.006
	Explicit	1.98	3.72	.595
Explicit	Implicit	8.57*	3.73	.025

The pairwise comparisons revealed that the balanced combination of implicit and explicit instruction helped learners gain significantly better

means on the pragmatic posttest than the implicit instruction ($MD = 10.56$, $p < .05$). Furthermore, explicit instruction could help learners enhance their speech-act pragmatic comprehension significantly better than implicit intervention ($MD = 8.57$, $p < .05$).

Research Question Three

This question of this study aimed at examining if there are any significant differences between the effects of synchronous computer-mediated instruction (SCMI) and asynchronous computer-mediated instruction (ACMI) on Iranian EFL learners' speech-act pragmatic comprehension. As shown in Table 1 above, the mean of speech-act pragmatic comprehension for the SCMI group ($M = 133.25$, $SD = 13.14$) is greater than the mean for the ACMI group ($M = 120.90$, $SD = 13.49$) on the posttest. Figure 3 illustrates the aforementioned mean score differences.
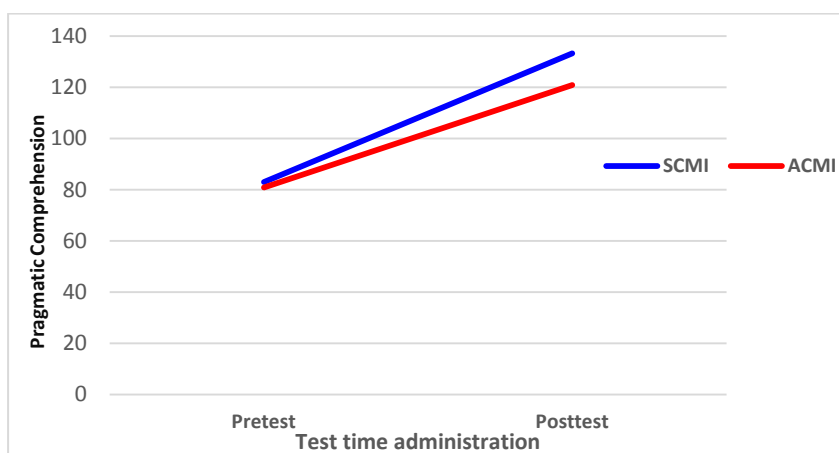

Figure 3. The SCMI and ACMI groups' means on the pragmatic comprehension test

Before applying the third one-way ANCOVA, Levene's test vindicated the availability of the homogeneity of variances ($F_{(1, 38)} = .035$, $p=.85 > .05$).

Besides, the homogeneity of the regression slopes was kept for the interaction between the pretest and posttest scores was insignificant ($F_{(1, 36)}$ = .46, p= .49 > .05). Finally, the linear relationship was also established between the pragmatic comprehension scores on the pretests and posttest ($F_{(1, 10)}$ = 24.12, p < .05). According to Table 6, the ANCOVA detected a statistically significant difference between the two groups' speech-act pragmatic comprehension scores on the posttest ($F_{(1, 37)}$ = 11.81, p < .05 $p\eta^2$= .24, demonstrating a moderate effect size) in favour of the SCMI group.

Table 6. The ANCOVA Results for SCMI and ACMI Groups' Scores on the Posttest

Source	SS	df	MS	F	P	$p\eta^2$
Pretest	3125.18	1	3125.18	32.01	.000	.46
Group	1153.47	1	1153.47	11.81	.001	.24
Error	3612.36	37	97.63			
Total	654185.00	40				

Further, Table 6 indicates that a strong relationship exists between the pre-intervention and post-intervention scores on the total speech-act pragmatic comprehension ($F_{(1, 37)}$ = 32.01, p < .05, $p\eta^2$= .46), demonstrating that the speech-act pragmatic comprehension scores gained on the pretest made a significant contribution to the speech-act pragmatic comprehension scores obtained on the posttest by the two groups.

DISCUSSION

The current study revealed some important findings. The first finding was that among the four general types of given treatments including NCMI, CMI, MUVEs, and MARG, the MUVE group's pragmatic comprehension improved significantly better than the other groups. The better pragmatic comprehension of those learners who received instruction through the use of the OpenSim as a very useful type of MUVE can be attributed to the salient features of this MUVE (Taguchi et al., 2017). The OpenSim could help learners absorb the pragmatic input in a cooperative environment through interactions with other learners, the teacher, and also the possibilities of this

virtual environment itself (Hellermann et al., 2013). Moreover, OpenSim could provide a non-threatening and motivating environment that engaged learners' affective, cognitive, and social capabilities all of which provided an optimal condition for pragmatic comprehension development based on the existing literature (e.g. Sykes & Dubreil, 2019; Taguchi et al., 2017). Before presenting any justifications for this finding, it should be noted that the effect size for the differences was moderate; accordingly, it should be noted in interpreting and generalising the results of the current study.

This finding cannot be directly compared and contrasted with other similar studies that have compared various types of technologies for teaching pragmatic comprehension; nonetheless, this finding is in line with some empirical studies that have reported the effectual influence of various types of MUVEs, in general and OpenSim, in particular (e.g. Blattner & Fiori, 2011; Hellermann et al., 2013; Pojanapunya & Jaroenkitboworn, 2011; Sykes, 2010). Sykes (2010), for example, reported that the use of OpenSim could promote L2 learners' pragmatic comprehension of Spanish as an L2. Hellermann et al.'s (2013) also vindicated the superiority of their own designed MUVE for enhancing L2 learners' speech-act pragmatic knowledge. However, as mentioned earlier, most of these few studies have focused on the use of OpenSim and other MUVEs for teaching and learning pragmatic production capabilities rather than pragmatic comprehension abilities. That's why direct comparisons are not possible.

Second, the CMI and NCMI groups significantly outperformed the MARG group on the pragmatic comprehension posttest. The effect size of .14 full-size differences is suggestive of a rather low to mediocre differences among the CMI, NCMI, and MARG groups. Although some previous studies have reported the effectiveness of various types of games for pragmatic development over noncomputer-mediated interventions (e.g. Holden & Sykes, 2013; Reinhardt & Sykes, 2014; Sykes, 2009), this study found that both computer-mediated and noncomputer-mediated types of instruction were more effective than the utilised mobile augmented reality games in this study including *Batman Bat-Tech Edition* and *Harry Potter-*

Wizards Unite. Therefore, this finding contradicts some of the previous studies in this regard. This finding can be justified on the ground that the selected games sometimes are very difficult to play and to enhance L2 learners' pragmatic comprehension, students should engage in playing them for a longer time (Sykes, 2009). Moreover, sometimes incorporating pragmatic knowledge as the input into these games is perplexingly difficult which may render the games artificial rather than natural as pointed out by Sykes (2009). Furthermore, some of the interactions among the players are in the form of pre-established commands rather than genuine interactions. Accordingly, direct instruction of pragmatic knowledge through traditional and technology-mediated possibilities can be more effective for enhancing pragmatic knowledge if such games have met the required qualities for the successful delivery of pragmatic information. Due to the paucity of research on the use of games for enhancing pragmatic comprehension, the results of this study are not directly comparable with the findings of previous studies; nonetheless, there is no agreement among the aforementioned studies that have studied the impact of games versus CMI and CMI types of instruction on general pragmatic development (González-Lloret, 2022).

Third, no significant difference was identified between CMI and NCMI groups though the CMI group had a higher mean score on the pragmatic comprehension posttest. The general trend in instructional pragmatics research indicates that CMI has been a little more effective than NCMI for enhancing pragmatic knowledge including both pragmatic production and comprehension (Abrams, 2013; González-Lloret, 2018; Sánchez-Hernández & Barón, 2022). However, there is no unanimous agreement among the scholars in this regard. Some of them have argued that computer-mediated instruction can be successful in enhancing L2 pragmatic knowledge if certain demands are met including learners' digital literacy, suitability of the used programs, cognitive difficulty of the input, appropriateness of the delivery, and the role of the teacher (e.g. Abrams, 2008; Sykes, 2017). Other scholars such as Cunningham (2019) have argued that if such demands are not met, computer-mediated instruction cannot be

as fruitful as it is claimed. Traditional NCMI has its own advantages and advantages as well. The NCMI is mostly delivered through face-to-face interaction in physical classes which necessarily entails more genuine interaction among the language learners in a natural setting. Moreover, in such traditional classes, the teacher can meticulously observe learners' pragmatic exchanges and failures and he can provide adequate scaffolding activities (Sykes & González-Lloret, 2020). Therefore, depending on the motivation of the learners and their preparedness, the traditional classes that do not use computer-based technologies can sometimes be more effective and encouraging for the learners because pragmatic information is received through interaction with peers and teachers in authentic real-world situations (Cunningham, 2016). Sykes (2017) maintained that the mediation of computers between the pragmatic information and exchanges that occur among the learners can sometimes be a hindrance rather than a help. On the other hand, the wise use of computers can complement traditional instruction if it is done appropriately and tactfully.

The fourth finding demonstrated that among the three types of NCMI, i.e., implicit, explicit, and balanced combination of them, both explicit and the balanced combination of explicit-implicit instructions could help learners do significantly better on the posttest of pragmatic comprehension than implicit instruction; nonetheless, no significant difference was identified between the explicit and the combination of explicit-implicit instruction though the combined instruction could help learners' achieve a higher mean on the post-test. In contrast to the previous findings, the effectiveness of explicit over implicit intervention has been strongly supported by various empirical studies in pragmatics literature (see Roever, 2012; Taguchi, 2017, 2019), demonstrating the advantages of direct teaching of pragmalinguistic forms and sociopragmatic norms. This study, however, found a mediocre effect size (.24) for the differences among the aforementioned study groups. Taguchi (2017) has mentioned more advantages of explicit instruction some of which are not possible through implicit interventions. However, it should be noted that implicit instruction

is also significant for enhancing pragmatic knowledge but to a lower degree in comparison with explicit instruction. The significance of the balanced type of E-I over implicit instruction and a better albeit non-significant effect over the explicit instruction itself has been theoretically supported by some renowned pragmaticians (e.g. Alcón-Soler, 2005; Bardovi-Harlig, 2015; Rose, 2009; Taguchi, 2015, 2017) although rigorous empirical studies are rare in this regard. Taguchi (2017) has argued that the balanced combination of the E-I has the merits of both approaches and the disadvantages of each side are compensated for by the advantages of the other side if such combination is conducted wisely and balancedly.

The fifth finding showed that synchronous CMI was more effective than the asynchronous CMI in enhancing L2 learners' pragmatic comprehension. The more significant contribution of SCMI over ACMI can be justified by the synchronous interactions among the students through computer-mediated possibilities that are more optimal for pragmatic comprehension than the delayed asynchronous interactions (González-Lloret, 2022). The superiority of synchronous over asynchronous interaction for pragmatic knowledge development irrespective of the mode of delivery (traditional or CMI) is a robust fact in pragmatics research that is supported by most pragmatics scholars (e.g. Cunningham, 2016, 2019; González-Lloret, 2022). The synchronicity of interactions, instructional interventions, and learning tasks with students' involvement and responses can promote pragmatic competence because the students exchange pragmatic knowledge in response to a current and moment-by-moment interchange for real purposes. Cunningham (2016) commented that such authenticity is absent from asynchronous interactions that are delivered through technologies such as telegram, WhatsApp, emails, and text messaging. Such powerful features of synchronous CMI can be relied upon for this finding obtained in the present study. This result is consistent with the findings of many previous studies reporting the more effectiveness of SCMI over ACMI for learning various types of pragmatic knowledge (e.g. Abrams, 2013; Barón & Ortega, 2018; Belz, 2007; Li 2013; Malmir & Mazloom, 2021; Sánchez-Hernández

& Barón, 2022; Takamiya & Ishihara, 2013). Nonetheless, as aforementioned for other types of technologies, most of such empirical studies have focused on the use of CMI for pragmatic production rather than pragmatic comprehension. The effectiveness of SCMI over ACMI for enhancing pragmatic comprehension has only been reported by a handful of studies (e.g. Takamiya & Ishihara, 2013).

CONCLUSION

The present research attempted to compare the effects of CMI, NCMI, MUVEs, and MARGs on EFL learners' pragmatic comprehension of the English speech acts and came to some important conclusions. Firstly, the OpenSim, as the utilized MUVE, could help learners boost their pragmatic comprehension better than other types of technology-mediated versus non-technology mediated instructions. Secondly, although CMI and NCMI were not significantly different from each other, they were more effective than the used games including *Batman Bat-Tech Edition* and *Harry Potter-Wizards Unite* in improving participants' speech-act pragmatic comprehension. Thirdly, among the three types of NCMI, the explicit and balanced combination of explicit-implicit instruction were more effective than the implicit intervention in pragmatic comprehension development; though the explicit and the combined E-I were not significantly different from each other. And finally, the SCMI turned out to be more effective than the ACMI in fostering participants' pragmatic comprehension.

The findings of this study pedagogically imply that L2 teachers should try to incorporate various types of technology-mediated pragmatic instruction particularly the MUVEs and SCMI in their classes in combination with traditional explicit and implicit types of instruction. Teachers can also utilize ACMI and MARGs for enhancing pragmatic comprehension by considering the influential factors such as the learners' digital literacy, the possibility of feeding pragmatic input into such technologies, and the amount of interaction in the use of such technological

aids. The current study utilised a pragmatic comprehension test of requests, apologies, and refusals; therefore, future studies can be done using more comprehensive pragmatic comprehension tests, more participants, and other types of the aforementioned technologies. For instance, future qualitative and mixed-methods studies can use other MUVEs and games to further scrutinise their advantages and disadvantages for pragmatic comprehension development. As mentioned by González-Lloret (2022), research on the use of various types of technologies for teaching pragmatic knowledge has just started and requires far extensive research to broaden our insights into the best possibilities for using such technologies in combination with the traditional face-to-face types of instruction.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Amir Shakouri   http://orcid.org/0000-0002-9642-6756
Ali Malmir   http://orcid.org/0000-0003-1589-0301
Rajab Esfandiari   http://orcid.org/0000-0002-2305-762X

References

Abrams, Z. (2008). Sociopragmatic features of learner-to-learner computer-mediated communication. *CALICO Journal, 26*(1), 1–27. https://doi.org/10.1558/cj.v26i1.1-27

Abrams, Z. (2013). Say what?! L2 sociopragmatic competence in CMC: Skill transfer and development. *CALICO Journal, 30*(4), 423–445. https://doi.org10.11139/cj.30.3.423-445

Alavi, S., Shahsavar, M., & Norouzi, M. (2020). Diagnosing EFL learners' development of pragmatic competence implementing computerized dynamic

assessment. *Issues in Language Teaching, 9*(1), 117–149. https://doi.org/10.22054/ilt.2020.42653.400

Alcón-Soler, E. (2005). Does instruction work for learning pragmatics in the EFL context? *System, 33*(4), 417–435. https://doi.org/10.1016/j.system.2005.06.005

Alcón-Soler, E. (2015). Instruction and pragmatic change during study abroad email communication. *Innovations in Language Learning and Teaching, 9*(1), 34–45. https://doi.org/10.1080/17501229.2014.995763

Bardovi-Harlig, K. (2013a). Developing L2 pragmatics. *Language Learning, 63*(Suppl.1), 68–86. https://doi.org/10.1111/j.1467-9922.2012.00738.x

Bardovi-Harlig, K. (2013b). On saying the same thing: Assessing the production of conventional expressions in L2 pragmatics. In T. Greer, D. Tatsuki, & C. Roever (Eds.), *Pragmatics and language learning* (Vol. 13, pp. 191–211). University of Hawai'i, National Foreign Language Resource Center.

Bardovi-Harlig, K. (2015). Designing instructional effect studies for L2 pragmatics: A guide for teachers and researchers. In S. Gesuato, F. Bianchi, & W. Cheng (Eds.) *Teaching, learning and investigating pragmatics: Principles, methods and practices* (pp. 135–164). Cambridge: Cambridge Scholars Publishing.

Bardovi-Harlig, K., & Bastos, M.T. (2011). Proficiency, length of stay, and intensity of interaction and the acquisition of conventional expressions in L2 pragmatics. *Intercultural Pragmatics, 8*(4), 347–384. https://doi.org/10.1515/iprg.2011.017

Bardovi-Harlig, K., Mossman, S., & Vellenga, H. E. (2015). Developing corpus-based materials to teach pragmatic routines. *TESOL Journal*, *6*(4), 499–526. https://doi.org/10.1002/tesj.177

Barón, J., Ortega, M. (2018). Investigating age differences in e-mail pragmatic performance. *System, 78*, 148–158. https://doi.org/10.1016/j.system.2018.08.001

Barron, A. (2003). *Acquisition in interlanguage pragmatics: Learning how to do things with words in a study-abroad context*. New York, NY: John Benjamin.

Belz, J. A. (2007). The role of computer mediation in the instruction and development of L2 pragmatic competence. *Annual Review of Applied Linguistics, 27*(1), 45–75. https://doi.org/10.1017/S0267190508070037

Birjandi, P., & Derakhshan, A. (2013). Pragmatic comprehension of apology, request and refusal: An investigation on the effect of consciousness-raising video-driven prompts. *Applied Research on English Language, 3*(1), 67–86. https://doi.org/10.22108/are.2014.15479

Blattner, G., & Fiori, M. (2011). Virtual social network communities: An investigation of language learners' development of sociopragmatic awareness and multiliteracy skills. *CALICO Journal, 29*(1), 24–43. https://doi.org/10.11139/CJ.29.1.24-43

Canto, S., de Graff, R., & Jauregui, K. (2014). Collaborative tasks for negotiation of intercultural meaning in virtual worlds and video-web communication. In M. González-Lloret, & L. Ortega, (Eds.), *Technology-mediated TBLT: Researching technology and tasks* (pp. 183–212). Amsterdam: John Benjamins.

Chapelle, C. A., & Sauro, S. (Eds.) (2017). *The handbook of technology and second language teaching and learning.* New York: John Wiley and Sons.

Corsetti, C. R. (2014). Strategy-based listening and pragmatic comprehension. *BELT: Brazilian English Language Teaching Journal, 5*(1), 4–14. https://doi.org/10.15448/2178-3640.2014.1.18090

Costa, M. C., Manso, A., & Patrício, J. (2020). Design of a mobile augmented reality platform with game-based learning purposes. *Information, 11*(3), 127–136. https://doi.org/10.3390/info11030127

Craig, A. B. (2013). Understanding augmented reality: Concepts and applications. Boston, MA: Morgan Kaufmann.

Cunningham, D. J. (2016). Request modification in synchronous computer-mediated communication: The role of focused instruction. *The Modern Language Journal, 100*(4), 484–507. https://doi.org/10.1111/modl.12332

Cunningham, D. J. (2019). L2 pragmatic learning in computer-mediated communication. In N. Taguchi (Ed.), *Routledge handbook of SLA and pragmatics* (pp. 372–386). London: Routledge.

Davis, W. A. (2007). How normative is implicature. *Journal of Pragmatics, 39*(10), 1655–1672. https://doi.org/10.1016/j.pragma.2007.05.006

Derakhshan, A., & Eslami-R., Z. (2015). The effect of consciousness-raising instruction on the comprehension of apology & request. *TESL-EJ, 18*(4). Available at http://www.tesl-ej.org/wordpress/issues/ volume 18/ej72/ej72a6/

Derakhshan, A., Eslami, Z., & Ghandhari, N. (2021). Investigating the interplay of emotional intelligence and interlanguage pragmatic competence in Iranian lower-intermediate EFL learners. *Issues in Language Teaching*, *10*(1), 37–66. https://doi.org/10.22054/ilt.2020.54334.527

Derakhshan, A., & Shakki, F. (2021). A meta-analytic study of instructed second language pragmatics: A case of the speech act of request. *Journal of Research in Applied Linguistics, 12*(1), 15–32. https://doi.org/10.22055/rals.2021.16722

Derakhshan, A., Shakki, F., & Sarani, M. A. (2020). The effect of dynamic and non-dynamic assessment on the comprehension of iranian intermediate EFL learners' speech acts of apology and request. *Language Related Research (LRR), 11*(4), 605–637. http://lrr.modares.ac.ir/article-14-40648-en.html

Félix-Brasdefer, J. C. (2007). Pragmatic development in the Spanish as a FL classroom: A cross-sectional study of learner requests. *Intercultural Pragmatics, 4*(2), 253–286. https://doi.org/10.1515/IP.2007.013

Félix-Brasdefer, J. C. (2008a). Data collection methods in speech act performance: DCTs, role plays, and verbal reports. In A. Martinez-Flor, & E. Uso-Juan (Eds.), *Speech act performance: Theoretical, empirical and methodological issues* (pp.41–56). Amsterdam: John Benjamins.

Félix-Brasdefer, J. C. (2008b). Pedagogical intervention and the development of pragmatic competence in learning Spanish as a foreign language. *Issues in Applied Linguistics*, *16*(1), 49–84. https://doi.org/10.5070/L4161005093

Field, A. (2018). *Discovering statistics using IBM SPSS statistics.* New York: Sage.

Garcia, P. (2004). Developmental differences in speech act recognition: A pragmatic awareness study. *Language Awareness, 13*(1), 96–115. http://dx.doi.org/10.1080/09658410408667089

Gómez, T., & Ede-Hernandez, L. (2021). Effectiveness of a post-study abroad pedagogical intervention in learning compliments and compliment responses in L2 Spanish. In J. César Félix-Brasdefer, & R. Shively (Eds.), *New directions in second language pragmatics* (pp. 81–102). Berlin: Mouton De Gruyter.

González-Lloret, M. (2008). Computer-mediated learning of L2 pragmatics. In E. A. Soler, & A. Martinez-Flor (Eds.), *Investigating pragmatics in foreign*

*language learning, teaching and testin*g (pp. 114-132). London: Multilingual Matters.

González-Lloret, M. (2018). Pragmatics in technology-mediated contexts. In A. Herraiz-Martínez, & A. Sánchez-Hernández (Eds.), *Learning second language pragmatics beyond traditional contexts* (pp. 15–46). New York: Peter Lang.

González-Lloret, M. (2022). Technology-mediated tasks for the development of L2 pragmatics. *Language Teaching Research, 26*(2), 173–189. https://doi.org/10.1177/13621688211064930

Godwin-Jones, R. (2016). Augmented reality and language learning: From annotated vocabulary to place-based mobile games. *Language Learning & Technology, 20*(3), 9–19.

Holden, C. L., & Sykes, J. M. (2011). Leveraging mobile games for place-based language learning. *International Journal of Game-Based Learning, 1*(2), 1– 18. https://doi.org/10.4018/ijgbl.2011040101

Holden, C., & Sykes, J.M. (2013). Complex L2 pragmatic feedback via place-based mobile games. In N. Taguchi, & J. M. Sykes (Eds.), *Technology in interlanguage pragmatics research and teaching* (pp. 155–183). Amsterdam: John Benjamins.

Kasper, G. (2001). Four perspectives on L2 pragmatic development. *Applied Linguistics, 22*(4), 502–530. https://doi.org/10.1093/applin/22.4.502

Kasper, G., & Rose, K. (2002). *Pragmatic development in a second language*. New York: Blackwell.

Kim, Y., & Taguchi, N. (2015). Promoting task-based pragmatics instruction in EFL classroom context: The role of task complexity. *The Modern Language Journal, 99*(5), 656–677. https://doi.org/10.1111/modl.12273

Koutromanos, G., Sofos, A., & Avraamidou, L. (2015). The use of augmented reality games in education: A review of the literature. *Educational Media International*, *52*(4), 253–271. https://doi.org/10.1080/09523987.2015.1125988

Laine, T. (2018). Mobile educational augmented reality games: A systematic literature review and two case studies. *Computers, 7*(1), 19–33. https://doi.org/10.3390/computers7010019

Lee, C. (2010). An exploratory study of the interlanguage pragmatic comprehension of young learners of English. *Pragmatics, 20*(3), 343–373. https://doi.org/10.1075/prag.20.3.03lee

Liu, P. E., & Tsai, M. (2013). Using augmented-reality-based mobile learning material in EFL English composition: An exploratory case study. *British Journal of Educational Technology, 44*(1), 1–4. https://doi.org/10.1111/j.1467-8535.2012.01302.x

Loukusa, S., Leinonen, E., & Ryder, N. (2007). Development of pragmatic language comprehension in Finnish-speaking children. *First Language, 27*(3), 279-296. https://doi.org/10.1177%2F0142723707076568

Maa, J., & Taguchi, N. (2022). Using L2 interactional-pragmatic resources in CMC: A case of Japanese orthography and emoji. *Language Teaching Research, 26*(2), 190–212. https://doi.org/10.1177/13621688211064934

Malmir, A. (2020). The effect of interactionist vs. interventionist models of dynamic assessment on L2 learners' pragmatic comprehension accuracy and speed. *Issues in Language Teaching, 9*(1), 279–320. https://doi.org/10.22054/ilt.2020.53398.515

Malmir, A., & Derakhshan, A. (2020). The socio-pragmatic, lexico-grammatical, and cognitive strategies in L2 pragmatic comprehension: The case of Iranian male vs. female EFL learners. *Iranian Journal of Language Teaching Research*, *8*(1), 1–23. https://doi.org/10.30466/IJLTR.2020.120805

Mohammad Hosseinpur, R., & Bagheri Nevisi, R. (2018). L1-based instruction: Does it work for learning pragmatics in the EFL context? *The Journal of Asia TEFL*, *15*(1), 233–241. https://doi.org/10.18823/asiatefl.2018.15.1.18.233

Malmir, A., & Mazloom, P. (2021). The impact of group dynamic assessment (GDA) vs. computerised dynamic assessment (C-DA) on Iranian EFL learners' pragmatic comprehension. *Journal of Applied Linguistics and Applied Literature: Dynamics and Advances, 9*(1), 67–94. http://dx.doi.org/10.22049/jalda.2021.26985.1222

Perez, C. J. (2017). Pragmatic comprehension of English refusals by Spanish-English bilinguals. *LSU Doctoral Dissertations*. 4102. https://digitalcommons.lsu.edu/gradschool_dissertations/4102

Plappert, G. (2019). Not hedging but implying: Identifying epistemic implicature through a corpus-driven approach to scientific discourse. *Journal of*

Pragmatics, *139*(1), 163–174. https://doi.org/10.1016/J.PRAGMA.2018.09.001

Plonsky, L., & Zhuang, J. (2019). A meta-analysis of second language pragmatics instruction. In Taguchi, N. (Ed.), *Routledge handbook of SLA and pragmatics* (pp. 287–307). London: Routledge.

Pombo, L., & Marques, M. M. (2021). Guidelines for teacher training in mobile augmented reality games: Hearing the teachers' voices. *Education Sciences*, *11*(10), 597-606; https://doi.org/10.3390/educsci11100597

Roever, C. (2012). What learners get for free (and when): Learning of routine formulae in ESL and EFL environments. *ELT Journal, 66*(1), 10–21. http://dx.doi.org/10.1093/elt/ccq090

Rose, K. R. (2009). Interlanguage pragmatic development in Hong Kong, phase 2. *Journal of Pragmatics, 41*(11), 2345–2364. https://doi.org/10.1016/j.pragma.2009.04.002

Ross, S. J., & Kasper, G. (Eds.) (2013). *Assessing second language pragmatics.* Palgrave Macmillan.

Salimi, E., & Karami, B. (2019). Pragmatic competence development: Demystifying the impact of task types and EFL students' perceptions. *Issues in Language Teaching*, *8*(1), 279–302. https://doi.org/10.22054/ilt.2020.48521.445

Sánchez-Hernández, A., & Barón, J. (2022). Teaching second language pragmatics in the current era of globalization: An introduction. *Language Teaching Research, 26*(2), 163–170. https://doi.org/10.1177/13621688211064931

Sarani, A., Talati-Baghsiahi, A. (2017). Explicit instruction of pragmatic features: Its impact on EFL learners' knowledge of hedging devices in academic writing. *Issues in Language Teaching, 6*(1), 53–29. https://doi.org/10.22054/ilt.2017.8418

Schauer, G. A. (2009). *Interlanguage pragmatic development: The study abroad context*. London: Continuum.

Sydorenko, T., Daurio, P., & Thorne, S.L. (2018). Refining pragmatically-appropriate oral communication via computer-simulated conversations. *Computer Assisted Language Learning, 31*(1), 157–180. https://doi.org/10.1080/09588221.2017.1394326

Sydorenko, T., Hellermann, J., Thorne, S. L., & Howe, V. (2019). Mobile augmented reality and language- related episodes. *TESOL Quarterly, 53*(3), 712–740. https://doi.org/10.1002/tesq.507

Sykes, J. M. (2005). Synchronous CMC and pragmatic development: Effects of oral and written chat. *CALICO, 22*(3), 399–432. https://doi.org/10.1558/cj.v22i3.399-431

Sykes, J. M. (2009). Learner requests in Spanish: Examining the potential of multiuser virtual environments for L2 pragmatic acquisition. In L. Lomicka, & G. Lord, (Eds.), *The second generation: Online collaboration and social networking in CALL* (pp. 199–234). Austin: Texas State University.

Sykes, J. M. (2010). Multi-user virtual environments: User-driven design and implementation for language learning. In G. Vicenti, & J. Braman (Eds.), *Teaching through multi-user virtual environments: Applying dynamic elements to the modern classroom* (pp. 283–305). New York: IGI Global.

Sykes, J. M. (2014). TBLT and synthetic immersive environments: What can in-game task restarts tell us about design and implementation? In M. González-Lloret, & L. Ortega, (Eds.), *Technology-mediated TBLT: researching technology and tasks* (pp. 149–182). Amsterdam: John Benjamins.

Sykes, J. M. (2017). Technologies for teaching and learning intercultural competence and interlanguage pragmatics. In C. A. Chapelle, & S. Sauro (Eds.), *The handbook of technology and second language teaching and learning* (pp. 119–133). New York: John Wiley and Sons.

Sykes, J. M. (2018). Interlanguage pragmatics, curricular innovation, and digital technologies. *CALICO Journal, 35*(1), 120–141. https://doi.org/10.1558/cj.36175

Sykes, J. M., & Dubreil, S. (2019). Pragmatics learning in digital games and virtual environments. In Taguchi, N. (Ed.), *Routledge handbook of SLA and pragmatics* (pp. 387–399). London: Routledge.

Sykes, J., & González-Lloret, M. (2020). Exploring the Interface of Interlanguage (L2) pragmatics and digital spaces. *CALICO Journal, 37*(1), i–xv. https://doi.org/10.1558/cj.40433

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). New York: Pearson Inc.

Taguchi, N. (2002). An application of relevance theory to the analysis of L2 interpretation processes: The comprehension of indirect replies.

International Review of Applied Linguistics, 40(2), 151–176. http://dx.doi.org/10.1515/iral.2002.006

Taguchi, N. (2005). Comprehending implied meaning in English as a foreign language. *The Modern Language Journal, 89*(4), 543–562. http://dx.doi.org/10.1111/j.1540-4781.2005.00329.x

Taguchi, N. (2007). Development of speed and accuracy in pragmatic comprehension in English as a foreign language. *TESOL Quarterly*, *41*(2), 313–338. https://doi.org/10.1002/j.1545-7249.2007.tb00061.x

Taguchi, N. (2008a). Cognition, language contact, and the development of pragmatic comprehension in a study-abroad context. *Language Learning*, *58*(1), 33–71. https://doi.org/10.1111/j.1467-9922.2007.00434.x

Taguchi, N. (2008b). Pragmatic comprehension in Japanese as a foreign language. *The Modern Language Journal*, *92*(4), 558–576. https://doi.org/10.1111/j.1540-4781.2008.00787.x

Taguchi, N. (2008c). The role of learning environment in the development of pragmatic comprehension: A comparison of gains between EFL and ESL learners. *Studies in Second Language Acquisition, 30*(4), 423–452. https://www.jstor.org/stable/44485809

Taguchi, N. (2009). Comprehension of indirect opinions and refusals in L2 Japanese. In N. Taguchi (Ed.), *Pragmatic competence* (pp. 249–274). Berlin: Mouton De Gruyter.

Taguchi, N. (2014). Development of interactional competence in Japanese as a second language: Use of incomplete sentences as interactional resources. *The Modern Language Journal, 98*(2), 518–535. https://doi.org/10.1111/modl.12087

Taguchi, N. (2015). Instructed pragmatics at a glance: Where instructional studies were, are, and should be going. *Language Teaching*, *48*(1), 1–48. https://doi.org/10.1017/S0261444814000263

Taguchi, N. (2017). Interlanguage pragmatics. In A. Barron, P. Grundy, & G. Yueguo (Eds.), *The Routledge handbook of pragmatics* (pp. 153–167). London: Routledge.

Taguchi, N. (Ed.). (2019). *The Routledge handbook of second language acquisition and pragmatics*. London: Routledge.

Taguchi, N., Gomez-Laich, P. M., & Arrufat-Marqués, M. J. (2016). Comprehension of indirect meaning in Spanish as a foreign language.

Foreign   Language   Annals,   *49*(4),   677–698.
https://doi.org/10.1111/flan.12230

Taguchi, N., Li, S., & Liu, Y. (2013). Comprehension of conversational
implicature in L2 Chinese. *Pragmatics and Cognition*, *21*(1), 139-157.
https://doi.org/10.1075/pc.21.1.06tag

Taguchi, N., & Roever, C. (2017). *Second language pragmatics*. Oxford: Oxford
University Press.

Taguchi, N., Li, Q., & Tang, X. (2017). Learning Chinese formulaic expressions in
a scenario-based interactive environment. *Foreign Language Annals, 50*(4),
641–660. https://www.learntechlib.org/p/192224/

Taguchi, N., & Yamaguchi, S. (2019). Implicature comprehension in L2
pragmatics research. In Taguchi, N. (Ed.), *The Routledge handbook of
second language acquisition and pragmatics* (pp. 31–46). London:
Routledge.

Tajeddin, Z., Keshavarz, M. H., & Zand-Moghadam, A. (2012). The effect of task-
based language teaching on EFL learners' pragmatic production,
metapragmatic awareness, and pragmatic self-assessment. *Iranian Journal of
Applied Linguistics, 15*(2), 139–166. http://ijal.khu.ac.ir/article-1-1585-
en.html

Takahashi, S., & Roitblat, H. L. (1994). Comprehension process of second
language indirect requests. *Applied Psycholinguistics, 15*(4), 475–506.
https://doi.org/10.1017/S0142716400006883

Tang, X., & Taguchi, N. (2020). Designing and using a scenario-based digital
game to teach Chinese formulaic expressions. *CALICO Journal, 37*(1), 1–22.
https://doi.org/10.1558/cj.38574

Tateyama, Y. (2009). Requesting in Japanese: The effect of instruction on JFL
learners' pragmatic competence. In N. Taguchi (Ed.), *Pragmatic competence*
(pp.129–166). Berlin: Mouton De Gruyter.

Taskiran, A. (2018). The effect of augmented reality games on English as foreign
language motivation. *E-Learning and Digital Media, 16*(2), 122–135.
https://doi.org/10.1177/2042753018817541

Teo, T., Khazaie, S., & Derakhshan, A. (2022). Exploring teacher immediacy-
(non)dependency in the tutored augmented reality game-assisted flipped
classrooms of English for medical purposes comprehension among the Asian

students. *Computers & Education, 179*. https://doi.org/10.1016/j.compedu.2021.104406

Zand-Moghadam, A., & Mohandes Samani, & F. (2021). Effect of information-gap, reasoning-gap, and opinion-gap tasks on EFL learners' pragmatic production, metapragmatic awareness, and comprehension of implicature. *Teaching English as a Second Language Electronic Journal (TESL-EJ), 25*(1). https://tesl-ej.org/pdf/ej97/a5.pdf