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The Role of Russian Spatial Preposition Structure in Russian Language Teaching

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Abstract

Russian was often taught as the primary foreign language at several of China's modern foreign language colleges. The development of students' Russian language competency in reading, speaking, writing, and listening is the primary goal of such institutions. The key to mastering a language is said to be the student's understanding of Russian spatial prepositions, which represent the scene based on the spatial relationship between objects. Prepositions, however, have been shown to be challenging for Russian language learners. Prepositions in the Russian language are typically taught without explanation, with each application being taught separately to the students. Traditional prepositional teaching method is inefficient which stressed the need for effective preposition teaching approach. To address this issue, we developed and investigated the efficacy of computer-aided three-dimensional image schemas (CTIS) for Russian spatial preposition teaching in this paper. The aim of this study is to enhance Chinese student ' s Russian language proficiency by strengthening their knowledge on Russian spatial prepositions. The students learning Russian as foreign language are selected and their demographic data are collected in the initial stage. 25 participants dataset were gathered from the Chinese university for the bi-foreign-language program.

Keywords: Russian Spatial Preposition; Russian Language Proficiency; Computer-Aided Three-Dimensional Image Schemas (Ctis); T-Statistics Test

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Introduction

The Chinese government encouraged the study of Russian at various educational levels in the 1950s as a result of China's warming relations with the Soviet Union. Russian was often taught as the primary foreign language at several Chinese universities. The establishment and advancement of foreign language programs at Chinese colleges have received significant support from the Chinese government. Foreign language programs have often been created to meet the requirements of the nation for socioeconomic exchange and to fulfill political objectives as prescribed by the government. University professors may choose to provide and improve these programs willingly or may be forced to do so under such socio-political circumstances (Han et al, 2019). In recent years, several Chinese institutions have introduced new foreign language courses that teach students not just English as a foreign language but also other languages like Japanese, German, or Russian (Huang et al, 2020; Mody and Bhoosreddy 1995). The government has pushed institutions in mainland China to provide degree programs in languages other than English in recognition of the importance of non-English foreign languages like Russian in supporting China's new developmental drive (Wu et al, 2021).

As contemporary society and, most notably, science and technology undergo periods of innovation, new educational and skill needs for specialists have emerged. In order to discover novel methods of improvement and growth, these procedures need for an advanced level of knowledge. The goal of today's university language programs is to improve the RFL training system and make it in line with Russian pedagogical norms. Modern Russia is bolstering and increasing its worldwide political and economic positions. Because of this, there has been a rise in the number of international students interested in studying at Russian universities, and there has also been an increase in the number of students aiming to learn Russian in order to better communicate with professors and classmates while also gaining specialized knowledge in their chosen field. RFL has been a formal academic field in Russian universities that serve overseas students and it has subsequently expanded, improved, and sought out novel approaches to teaching the Russian language abroad (Ismailova et al 2018).

Executive functions (EF) and language are the key markers of development in preschool children, creating the framework for school preparation and functioning as predictors of later academic performance, as has been shown in research from other nations as well. To sum-up, both language and EF are among the most essential cognitive skills defining 6–7-year-old children's preparation for school (Veraksa et al 2022).

According to (Kalyuga 2022), the Russian language has a robust prepositional structure. Russian prepositions are crucial for extending sentences' length. Russian spatial prepositions, which define spatial settings in the language, are a good place to start when describing how to utilize prepositions. According to the geometric configuration and characteristics of the objects, these spatial prepositions represent the scene (Dittrich et al, 2015). The list of spatial prepositions used in Russian is shown in Table 1. Most students who are studying Russian as a second or foreign language think they have trouble knowing when and how to use prepositions. Prepositions in Russian are notoriously challenging for non-native speakers. Prepositions have no set norms for use, making it challenging to learn how to use them appropriately in a foreign language. Because of this, improper use of spatial prepositions may cause context to be misunderstood. When prepositions, like spatial prepositions, describe links between objects and events, their improper usage may alter the meaning of sentences. (Khan 2022) found that learners' uncertainty over prepositions seemed to be the main cause of their learning problems.

Table 1. List of Russian spatial prepositions with examples

Russian Spatial Preposition	**Example**	**English translation**
на	Мужчина сидит на стуле Картина на стене Мужчина идет на сигнал	A man is sitting on the chair A picture is on the wall A man is moving towards the signal

у	Мужчина у себя дома	A man is at his home
в	Мяч в коробке	A ball is in the box
к	Девушка движется к своей школе Сегодня она идет к своей подруге домой	A girl is moving towards her school She is going to her friend's home today
под	Кот под столом	A cat is under the table
за	Мужчина стоит за деревом	A man is standing behind the tree
перед	Мужчина стоит перед деревом	A man is standing in front of the tree
между	Мужчина сидит между двумя детьми	A man is seated between two children
среди	Мяч был спрятан среди листьев	The ball was hidden among the leaves
из	Вода течет из бака	The water is flowing from the tank

The most popular pedagogical strategy for teaching prepositions is to have pupils just discover the many applications on their own, without any more explanation on different usages of each preposition by the instructor. Such a strategy is based on the premise that prepositional uses are unpredictable and must instead be learnt context by context. Using grammar guides to learn how to utilise prepositions appropriately in all situations is challenging. It is unlikely to improve learners' knowledge of how prepositions are really employed and why the same preposition may convey a broad variety of meanings by asking them to recall a list of distinct, unconnected applications year after year (Paliczuk 2020; Li and Zihan 2022).

Animations and three-dimensional graphics are effective visual aids that may be utilised by instructors to help students learn a foreign language. For instance, to express the spatial relationship between the objects, the use of visual cues or animated pictures inspired by cognitive linguistics is essential to illustrate the use of spatial prepositions (Garg and Harita 2021). Although a considerable amount of literature has revealed the effectiveness of cognitive linguistics for English language development, the application of image schemas specifically designed as learning tools in Russian teaching settings for college students has been limited.

When teachers required children to imitate and remember, they lost interest in homework. Processing and remembering homework are repetitious drills that decrease homework motivation. Copying and remembering activities are typically easy and don't need significant cognitive thinking. If students find this homework boring or superfluous, they may not do it. In the tested region of China, instructors' frequency of assigning hard, real-life, or self-designed math homework was linked to increased math interest and student homework engagement. Primary and secondary school students want to improve the learning motivation of Legal English students by teaching Russian spatial preposition structure. This motivated us to perform this research. The contributions of this paper are as follows.

To develop Computer-aided Three-dimensional Image Schemas (CTIS) for Russian spatial preposition teaching in “Russian as a foreign language” classroom and further to investigate the efficacy of CTIS in improving the understanding of Russian spatial prepositions and language proficiency of Russian language learners, in comparison with standard Blackboard based Russian Teaching.

Literature Review

Wang and Zheng 2021 examined the motivation of Chinese university students towards multilingual learning. In an experimental group using e-learning platform, (Kosareva et al, 2021) looked at the effectiveness of teaching Russian as a second language (L2) while the control group took a conventional course. When teaching English prepositions using cognitive linguistics-inspired schematic diagrams in a computer-assisted system named "English Preposition Tutor", they (Wong et al, 2018) looked at the results. Their study is not reliable because control group used in their study did not receive any instruction on prepositions. By including a contextual

component into the L2 Motivational Self System, (Zheng et al, 2019 and Ahmed et al, 2020) expanded the understanding of student's desire to study languages other than English (LOTEs) in Chinese universities. Though they have made an attempt to look into the student's motivation for LOTE learning, more thorough investigation would likely provide more illuminating findings.

The efficacy of multimedia glossing with cognitive linguistics-dependent picture schemas given in two modalities namely animated and static, on college students studying English as L2 in Taiwan was examined (Lai et al, 2021). Verbalizers need more instruction than what is given to them in their studies to benefit from animation visual aids. Students' experiences in terms of information acquisition and pleasure while studying using a mix of augmented reality (AR) and voice recognition technologies were examined by (Dalim et al, 2020 and Salihu and Zayyanu Iyya 2022). They created a TeachAR prototype AR interface to test the efficacy of voice recognition and AR in teaching foreign language terms for spatial connections.

In a Russian as a foreign language (RFL) classroom in Japan, (Horii 2022) they investigated the use of material mediation-dependent L2 writing exercises. They looked at how students use tangible objects to create texts while engaging in L2 writing exercises. They (Dokukina and Gumanova 2020) assessed the use of intelligent chatbots in educational contexts to help learners of foreign languages comprehend grammar. However, (Shahabaz and Afzal 2021) note that the use of chatbots in foreign language acquisition is yet experimental. The research (Alfadil 2020) investigated the impact of the virtual reality (VR) game named "House of Languages" on intermediate school students' acquisition of vocabulary while learning Spanish, German, Russian, and English. They lack sophisticated qualitative research that aid in gaining in-depth information about how students see this VR method of learning a foreign language.

Methodology

Because Visual image schemas found a place in the education context, expanding their use into the Russian as a foreign language classroom seems an important research extension in Chinese universities. This work examined efficacy of teaching Russian spatial preposition in two groups of students – the first benefited from the CTIS based teaching (experimental), and the second underwent a traditional blackboard based Russian teaching. The methodology followed in this research is depicted in figure 1.

Participants

The research was conducted on students of a Chinese university which belongs to prestigious group of National Key University. The participants were selected from first- and second-year undergraduate cohorts. The participants in our research are enrolled in a "bi-foreign-language program" in which they study Russian in addition to English. Twenty-five students, 21 girls and 4 boys with an average age of 18.63, were to participate in the study (Huang et al, 2022). The inclusion and exclusion criteria for participant selection were listed below. The demographic features of the study are presented in the table 2.

Inclusion Criteria

*Students who are willing to learn Russian language.

*Students who would like to gain knowledge on Russian spatial prepositions.

Exclusion Criteria

*No prior training on Russian language.

*Students of age below 18 years.

*Students undergoing training on other foreign languages like French, Japanese, German, and so on.

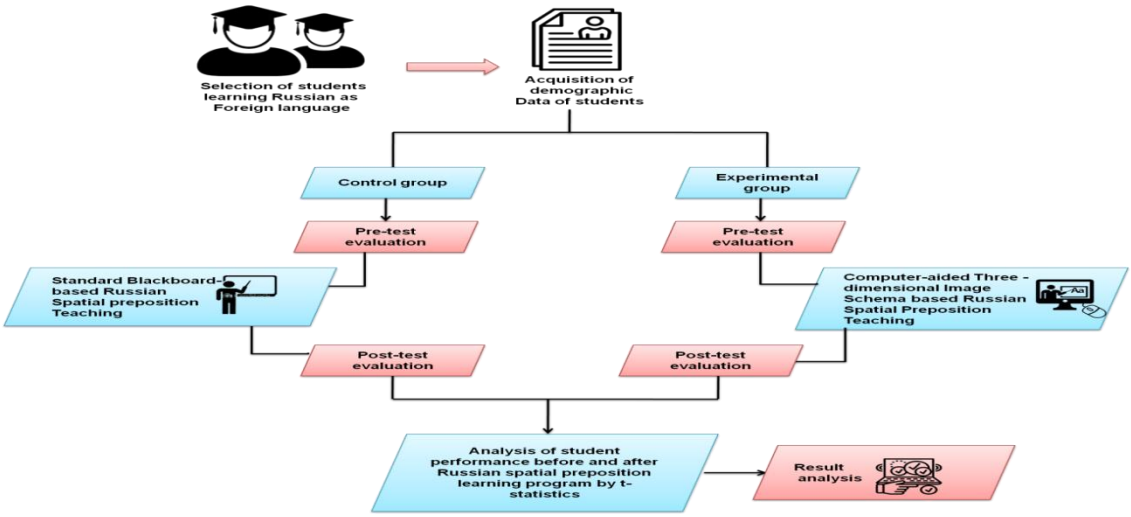

Figure 1. Methodology of our research work

Table 2. Demographic Data of Russian language students

Variables			**Number of participants**
Age			18.63 (Average age)
Gender	Female		21
	Male		4
Cohort	First-year		16
	Second-year		9
Instruction period (h/week)	First-year	English Training	16 (Average h/week)
		Russian Training	8 (Average h/week)
	Second-year	English Training	12 (Average h/week)
		Russian Training	10 (Average h/week)

Participant Allocation

The participants learning Russian as a foreign language were categorized into two cohorts namely control and experimental cohorts. Control group (11 participants) will obtain standard Blackboard based spatial preposition teaching in Russian classroom. Experimental group (14 participants) will experience CTIS-based spatial preposition teaching in Russian classroom. Before starting the training session, pre-test evaluation regarding language proficiency, spatial preposition knowledge, prepositional error, and acceptability, is conducted in each cohort. The instructor employed blackboard to teach Russian spatial prepositions in control group. The instructor explained the uses of different spatial prepositions with providing examples for each preposition.

Computer-aided Three-dimensional Image Schemas

Experimental group received CTIS-based Russian spatial preposition teaching. Dynamic animations of the CTIS were displayed to each student through 15-inch LCD monitor. The experimental set of students was instructed to view each visual image schemas three times before studying the written comments on the worksheet that was given to them. Throughout the program, the instructor delivers further instructions on spatial prepositions. The training session lasted 20 to 30 minutes. To encourage learners to digest information more cognitively, the multimodal glossing of each Russian spatial preposition was first provided with visual assistance and then with written comments. Figure 2 depicts the three-dimensional animated images of spatial relationships between two objects. After the session was over, the worksheet was recovered, a 10-

minute break was provided to the students. Then the post-tests about which the participants were not informed were given to evaluate their performance.

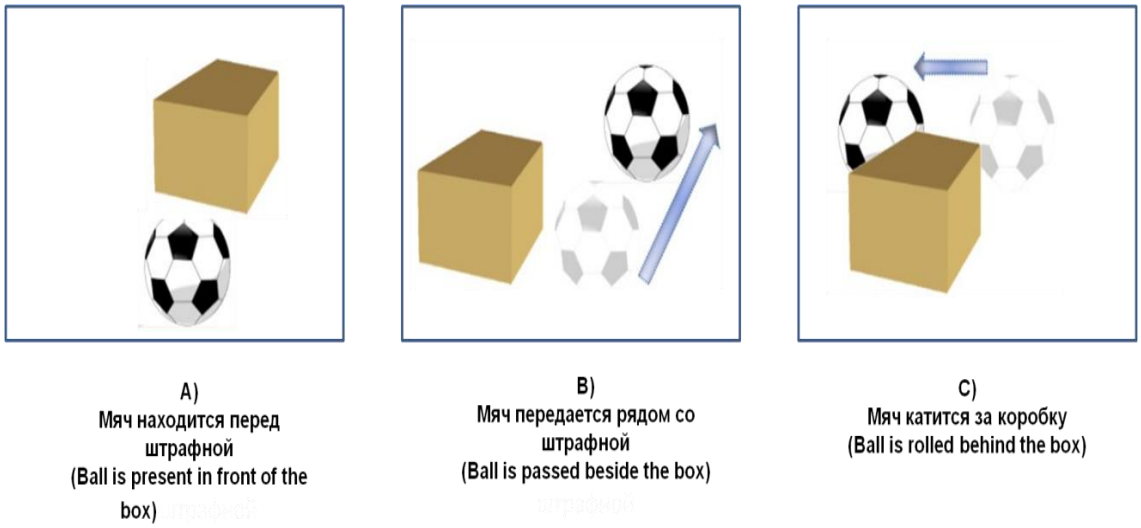

Figure 2. Examples of CTIS for Russian spatial prepositions

Post-test Evaluation

The testing session was conducted using a pre-test and post-test design consisting of a writing test and fill-in-the-blanks exam in pen-paper format to assess participants' perceptual acquisition of the prepositional knowledge from various viewpoints after training. On the basis of the senses of the spatial prepositions they had acquired, participants had to write as many sentences as they could in the allotted 15 minutes for the writing exam. In a fill-in-the-blanks exercise, participants had to insert the proper spatial prepositions in each blank. The whole test was conducted for 30 minutes.

Statistical Analysis

The pre- and post-test results were compared statistically using a t-test analysis to see whether there was any difference in gaining Russian spatial preposition knowledge and language proficiency between two groups. To compare means between participant groups that were unrelated to one another in any manner, a t-test analysis was used in this study.

Results

The efficacy of proposed CTIS in teaching Russian spatial prepositions is evaluated in this section by comparing against traditional blackboard-based teaching. Different criteria like language proficiency, spatial preposition knowledge, prepositional error, and so on were considered for the statistical analysis. The mean pre-test and post-test scores were obtained for control and experimental group using individual pre-test and post-test scores. Table 3 presents the statistical analysis of pre- and post-test data of students using t-statistic method. From table 3, it is noticed that there is no significant difference in pre-test scores between students in the receiving standard teaching and those receiving CTIS because t-statistic value is less than 2. This suggests that both groups had the same RFL proficiency and spatial preposition knowledge level at the onset of the training session. But there is a statistically-significant difference in post-test scores between students receiving standard teaching and those receiving CTIS because t-statistic value is greater than 2. This suggests that proposed CTIS-based Russian spatial preposition teaching improved student ' s RFL proficiency and spatial preposition knowledge level and greatly influenced Russian teaching than standard teaching method.

Table 3. Statistical analysis for control and experimental groups

Variables		Pre-test			Post-test		
		Control Group	Experimental Group	t-statistic	Control Group	Experimental Group	t-statistic
Knowledge on Russian Spatial prepositions		4.1	5	0.89	5.7	9.9	4.6
Prepositional Errors	Omission of prepositions	8	7.9	1.23	7	2.3	3.7
	Misuse of prepositions	8.2	8.34	0.99	6.9	2.24	5.2
Russian language proficiency	Writing Skills	3.8	3.9	1.2	5.5	9.78	4.9
	Speaking skills	4	4.4	1.45	5.7	9.8	4.98
Motivation towards learning Russian as a foreign language		2.1	3	1.22	3.1	9.5	3.56
Student satisfaction with the training program		3	3.4	0.44	6	9.76	6.2
Confidence while speaking Russian language		2.8	2.65	0.56	4	9.4	3.67
Training session will help in making students understand where to use spatial prepositions		3.4	3.67	1.22	4.67	9.12	4.76
Training session will help in making students understand different senses of spatial prepositions		3.7	3.45	0.96	5.32	8.97	5.12

We also compared the efficacy of proposed CTIS-based teaching with existing teaching methods adopted in Russian teaching like TeachAR Interface, Material Mediation-based Second Language Writing (MML2W), VR-House of Languages Interface, and ISpring platform in addition to standard teaching.

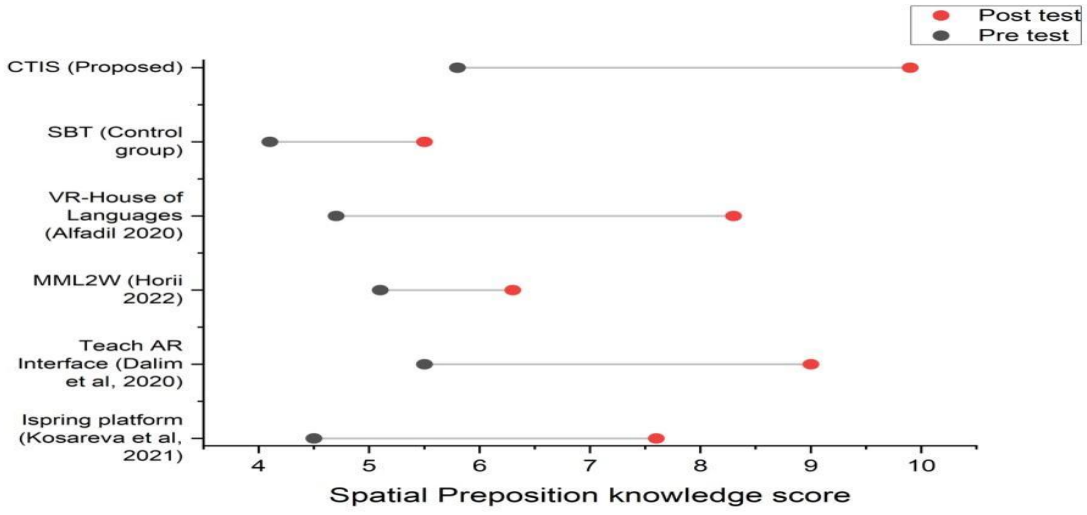

Figure 3. Spatial Preposition knowledge score obtained using different teaching methods

Figure 3 shows that post-test mean score for knowledge on Russian spatial preposition observed for CTIS was higher than that observed for TeachAR, MML2W, VR-House of Languages, ISpring, and standard teaching. This confirmed that CTIS-based teaching helps students gain understanding on different usages of spatial prepositions in Russian language.

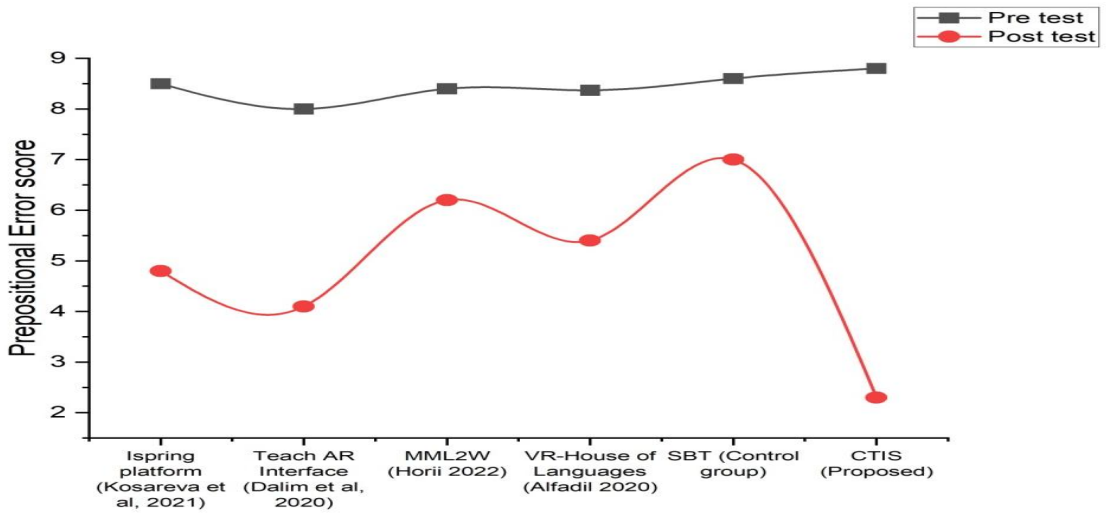

Figure 4. Prepositional Error score before and after adoption of different teaching methods

From figure 4, it is realized that post-test mean score for prepositional errors observed for CTIS was lower than that observed for Teach AR, MML2W, VR-House of Languages, ISpring, and standard teaching. This confirmed that CTIS-based teaching helps students understand clearly when and where to use different spatial prepositions in Russian language. Omission and misuse of spatial prepositions have reduced in student's communication after undergoing CTIS-based RFL program.

Russian as a foreign language (RFL) proficiency is measured in terms of how well the students master in writing and speaking Russian language. The post-test mean score for RFL proficiency observed for CTIS was higher than that observed for Teach AR, MML2W, VR-House of Languages, ISpring, and standard teaching, as observed from figure 5. As a result, CTIS-based teaching helps improve the fluency and accuracy of student's communication through Russian language. In addition, post-test mean score for motivation towards RFL learning observed for CTIS was higher than that observed for Teach AR, MML2W, VR-House of Languages, ISpring, and standard teaching. This is reported in figure 6. This result proves that CTIS-based teaching creates interest in Chinese students to learn Russian as a foreign language.

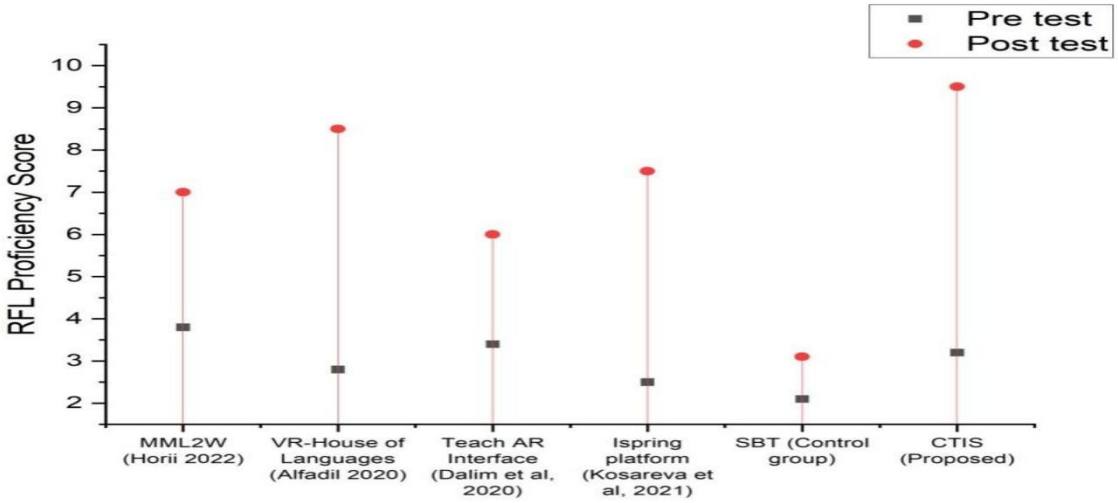

Figure 5. RFL proficiency score obtained using different teaching methods

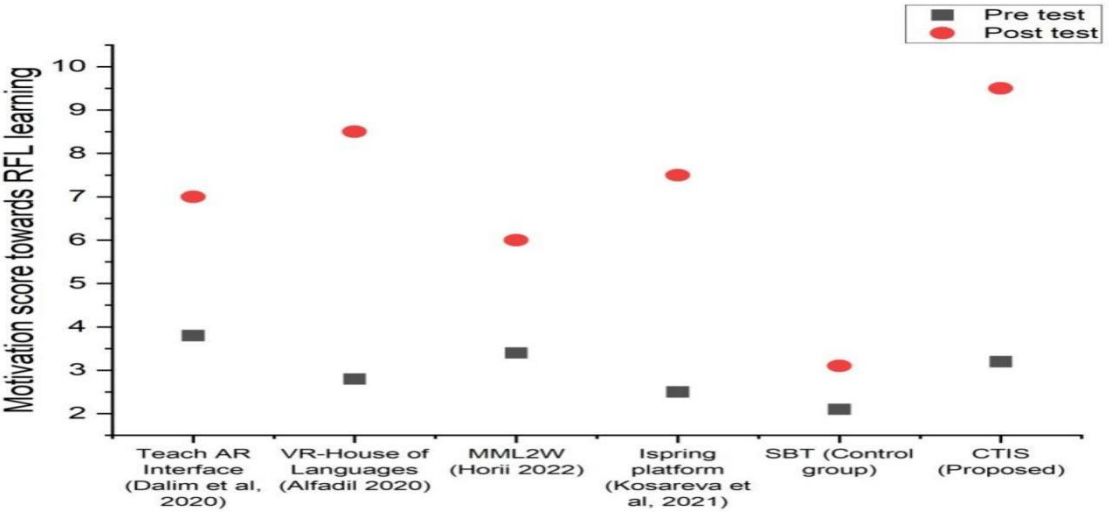

Figure 6. Student Motivation towards RFL learning using different methods

Discussion

The degree of foreign language proficiency in the context of professional communication has received particular attention in the contemporary professional community (Zubkov 2020). Chinese government has energetically renewed their investment in promoting languages other than English like Russian/Japanese/Turkish in higher education institutions due to theemerging social, political and economic needs (Gao and Zheng 2019). An efficient methodological framework for non-native speakers of Russian to learn the language is necessary since it seems to be the most widely spoken foreign language apart from English in China (Dolzhikova et al, 2018). Hence, we developed CTIS-based spatial preposition teaching in RFL classroom in this paper. To prove its efficiency, comparison of CTIS with other teaching strategies in RFL such as TeachAR, MML2W, VR-House of Languages, ISpring, and standard teaching was performed. Though these existing teaching strategies in RFL influences Russian teaching, it is associated with certain issues which are discussed below. Most participants in the TeachAR platform expressed worry about the amount of effort required to physically push the mouse button, and there were instances when students struggled to understand the instructions (Dalim et al, 2020). Qualitative studies in evaluating the efficacy of VR-House of languages must be refined (Alfadil et al, 2020). Students following MML2W and standard teaching methods are confused to use spatial prepositions in

Russian language (Horii 2022). Hence, MML2W and standard teaching methods resulted in lower benefit for RFL learning. But CTIS greatly enhanced non-native student's knowledge on Russian spatial prepositions, which in turn improved their proficiency in Russian language. Thus, teachers could benefit from the CTIS to develop students' skills in the writing and speaking Russian language.

Conclusion

To satisfy the linguistic demands of economic globalization along the Belt and Road, it is essential to diversify the nation's proficiency in foreign language. We developed CTIS-based spatial preposition teaching to enhance the Russian language proficiency of Chinese students. The findings imply that incorporating CTIS methodology into RFL instruction is a viable tactic and may be more effective than the conventional learning approach for acquiring spatial prepositions of Russian language. The goal of this project is to provide the groundwork for incorporating CTIS technology in the area of enhancing non-native speakers' RFL competency. In the classroom, teachers may use CTIS to empower and motivate non-native speakers to learn Russian. The limitations of this study are that the efficacy of the proposed spatial preposition teaching was evaluated on small dataset. Hence, in the future, we must test the efficacy of CTIS in Russian teaching by involving more universities, schools, and students.

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