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Using multimedia language lab to develop linguo-cultural competence

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ABSTRACT

The article is devoted to the problem of developing students' linguo-cultural competence by means of a multimedia language laboratory. The multimedia language laboratory is used to create an artificial linguo-cultural environment in a regular classroom with the help of authentic audio and video materials carefully selected and methodically prepared by the teacher. The research is based on the methods of analysis and synthesis, comparison and generalization, theoretical methods related to the study of scientific literature, and experiment. In the course of the experiment, which involved 185 students, the researchers proved that the integrated use of multimedia language lab capabilities allows improving the performance and quality of students' linguo-cultural competence, promotes the activation of educational and cognitive activities, and helps teachers in motivating their students to learn languages. The reliability of the experimental data was confirmed by the method of mathematical statistics. On the basis of the research results it is concluded that the use of the multimedia language lab makes the process of learning a foreign language more effective and dynamic and contributes to the development of students' linguo-cultural competence.

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1. INTRODUCTION

Global trends in international economic and cultural cooperation require fast and effective mastery of communication means. An integral component of professional communication, in addition to purely professional knowledge, is also mastery of a foreign language at an appropriate level, which involves a set of knowledge of linguistic and cultural nature. What is meant here is a linguo-cultural competence (LCC), which is an integrative quality of personality which combines communicative knowledge and skills with the ability to understand and interact with representatives of another linguistic and cultural society [1]–[3]. Linguistic and cultural worldviews form integrity in the mind of a native speaker and interact in the process of intercultural communication [4]. Language, as a part of culture, contains cultural codes (information about values, sociocultural attitudes and mentality) [5], [6], so mastering a foreign language culture is carried out through the means of a foreign language and in the process of learning it [7]. For example, Asiri and Metwally proved that students who made linguistic mistakes were also unable to correctly understand the cultural aspects of some sentences [8].

Linguo-cultural competence is formed by mastering linguistic and cultural knowledge through the study of regional information and observing the verbal and non-verbal communicative behavior of a native

speaker in a specific communication situation [1], [3], [9]. Mastering a non-native language in specific conditions when students lack the possibility of communicating with native speakers, i.e. there is no immersion in the authentic language and cultural environment, should take place in the context of artificially created linguistic and cultural space of a target language. This space is called a linguo-cultural environment (LCE) which represents the content and subject basis of the language learning, as well as linguo-cultural and intercultural interaction, and provides the educational process with means of computer-mediated communication in a foreign language, tools of socialization in foreign culture, and distance learning of linguo-cultural realia [2].

The ability to successfully function in foreign language communication determines the use of the latest educational technologies, including multimedia tools, into the process of teaching a foreign language. The use of multimedia technologies transforms the learning process, making it more technologically advanced and successful [10]. The main result is the interest of students, their readiness for creativity, the need for new knowledge and a sense of independence which contributes to the development of students' motivation to learn, activate, and focus on the subject. Motivation is considered to be a key factor in the process of learning a foreign language [11].

To create an artificial target LCE, it is important to take into account broad possibilities of multimedia. A traditional language laboratory is a classroom equipped with electronic sound reproduction devices that allow students to hear samples of foreign language pronunciation, as well as to record and listen to their own voices. The innovative language laboratories combine the functions of a traditional laboratory with audio or audiovisual installation facilities and are equipped with the appropriate software [12]. The multimedia language lab (MLL) is a room consisting of a block of learning technological tools that can share audio, audio-visual and/or written materials to any number of students in individual seats or cubicles with a wide range of potential feedback mechanisms between a teacher and students, or students among themselves.

The term "multimedia" was formed from the Latin and can be translated as "multiple means" or "many environments". Multimedia is interactive computer integrated systems which process texts, language, audio, photos, video and animated computer graphics and form a learning tool for people to use [13], [14]. Multimedia technology in learning is a system of integrated interaction of visual and audio effects under the control of interactive software using modern hardware and software in one digital reproduction. For effective learning, it is necessary to carefully select a set of multimedia technologies that will make the learning environment flexible enough [15].

The issues of using the internet and multimedia technologies in the process of foreign language teaching have been studied since the 90s of the XX century. Computers and high-quality software motivate students to learn a foreign language. Problems of creating information learning tools, including electronic, multimedia, distance and communicative, have also been investigated by several researchers.

According to many prominent scholars, it is difficult to overestimate the innovative value of modern multimedia resources in foreign language teaching. Interactivity, which is able to structure and visualize information, strengthens students' motivation and activates their cognitive activity at the level of consciousness and subconsciousness [16]. Such interactive tools as graphics, animation, photos, videos, sound, and text create an integrated information environment in which the user finds qualitatively new opportunities that can be a significant tool to enhance students' learning activities [13]. Presentation of educational content in a coordinated ensemble of different sign systems simultaneously activates multiple sensory channels of students (e.g., visual, auditory, tactile) [17]. According to Lai *et al.*, "A multimedia learning environment can present relevant materials in various formats and help students to process the materials in meaningful ways, for example, by integrating learning materials with relevant prior concepts, and organizing them into a consistent and coherent cognitive structure" [18].

The increasing pace of multimedia technologies is changing approaches to education, which is aimed at finding comprehensive talents and introducing more innovative technologies. Universities have transformed classrooms into language laboratories, which are key platforms for practical foreign language training. For language courses, both in the language department and in non-language majors, the language laboratory plays a very important role for language practice [12]. However, language labs do not always meet the requirements of modern language practice [19]. It is necessary to use the latest educational multimedia complexes that can bring the classroom closer to the conditions of an authentic language environment. The study showed that when a language classroom is modernized with the latest tools or multimedia, it greatly facilitates learning and gives it new incentives [20], [21].

NIBELUNG software package belongs to the latest multimedia technologies. The program can transform any computer classroom into an interactive LCE on the basis of the MLL. Equipped with appropriate software, the MLL system offers a large number of functions for managing information and Internet resources to teach foreign languages. Due to a wide range of features, such as audio, video, interactive whiteboard, messaging and testing applications, MLL significantly enhances students' speech activity while teaching foreign language communication. Due to the MLL, the teacher can allocate learning

time most effectively and provide new impetus to the learning process, whereas students receive more learning material for independent study.

Systematic use of audio and video materials based on MLL plays an important role in creating an artificial LCE. Audio allows you to engage with authentic materials voiced by native speakers in their context [22]. Authentic audio texts are any unprepared spoken texts that are often transmitted through technologies such as radio, television/video, and the Internet. The need to use authentic texts in listening is to give students a greater degree of independence when they are in a target language environment in a real-life context [23].

A greater range of possibilities is offered by the use of authentic video, which appeals to different senses and channels of cognition: spoken language is supplemented with visual elements that facilitate the perception and understanding of dialogues, and real speech in an everyday environment is demonstrated. Students get a visual representation of the life, traditions, linguistic realities of the target language country, whose language they are learning. Watching videos helps to understand another culture and mentality. Videos show students how people of a different language culture behave in various communication situations. The use of video diversifies the presentation of new material, and simplifies information that is difficult to understand in foreign language thanks to sufficient visualization based on the keywords of the message [22].

According to Manko and Khitsenko, authentic audio and video material is a source of obtaining extralinguistic information, it helps to distinguish the emotional state of speakers, the presence of dialectal or sociolectic features in their speech behavior [24]. The use of audiovisual materials intensifies the educational process because this type of work allows students to "turn on" all channels of information perception at the same time, and the multimedia options of MLL provide opportunities to emphasize the most significant moments of the lesson in an accessible form, to practice foreign language communication skills and abilities. Such a media hybrid allows you to successfully solve complex tasks and helps better assimilate new material when working systematically with audio and video and methodically organized support [25].

The analysis of the research on the problem under question has proved that today there are many theoretical and practical studies dedicated to the possibilities of using educational multimedia technologies in learning a foreign language. It is traditional to use a language laboratory for modern language learning purposes. The effectiveness of using multimedia software systems, in particular innovative language laboratories, to provide new incentives for learning a foreign language requires thorough attention from researchers. This determines the relevance of the research topic. The hypothesis proposed in this study is as: the study is based on the assumption that the process of forming LCC of future specialists (university students) will be effective if a multimedia laboratory is introduced into the foreign language learning. The research aims to study the effectiveness of the use of the multimedia language laboratory in creating an artificial LCE for developing students' LCC, as well as to focus on its advantages in learning a foreign language.

2. RESEARCH METHOD

The research is based on such methods as analysis and synthesis, comparison and generalization, and study of theoretical literature, periodicals, pedagogical, and psychological publications. We utilized the method of mathematical statistics to validate the reliability of our findings. This approach ensures the credibility of our conclusions.

The research sample was formed by means of the convenience sampling method. Convenience sampling is a non-probability sampling technique in which the components for the sample are selected based on their availability to researchers [26]. Students were selected not from the entire population, but from its typical parts – academic groups. This method of selection was chosen because the attribute under study (in particular, linguo-cultural knowledge) could differ significantly in different academic groups. Students from each group were selected by a simple random method. As for the number of experimental subjects, it can be limited to several dozens of people provided that there is a control group. 185 third-year students were selected from the Donetsk National Technical University, Mariupol State University, Uzhhorod National University, and Horlivka Institute of Foreign Languages of Donbas State Pedagogical University.

Both male and female were selected for data collection. In terms of sampling strategy, participants were selected based on their availability and accessibility for the researchers. In terms of demographic composition, a larger number of students were female (72.5%) compared to the group of males (27.5%). The average age was 20.8 years.

In order to ensure the objectivity of the experiment and the reliability of the research results, the composition of the experimental and control groups was as typical and equivalent as possible in terms of initial parameters: number, age, gender, and level of training. As a result of the selection, 95 students (n_1=95)

were included in the control group (CG). The size of the experimental group (EG) was 90 students (n_2=90). Prior to the experiment, the selected groups were in the same conditions, since their education and training was regulated by the same programs and carried out according to similar curricula of higher education institutions.

For a sound and objective analysis, the following diagnostic apparatus has been developed: criteria, indicators and levels of formation of the LCC, and appropriate diagnostic methods. The criteria include cognitive (synthesis and mastery of the native and foreign languages, language literacy, synthesis of knowledge about the native and foreign cultures, understanding the mechanism of intercultural interaction) and communicative (formation of communicative skills and behavioral qualities for effective intercultural communication). Levels of formation are low, medium, and high.

The ascertaining stage of the experiment was aimed at evaluating the levels of LCC according to these criteria. It was carried out by complex monitoring on the basis of questionnaires, testing, surveys, and generalization of the obtained results. During the formative stage of the experiment, the practical implementation of MLL was carried out to create an artificial LCE [2]. The effectiveness of the experiment and the reliability of the results obtained were confirmed by the methods of mathematical statistics using the Fisher's angular coefficient, which is designed to compare two samples by the frequency of the effect.

Let's consider some tasks which were done and assessed during German language classes. When discussing the topic "*Aktiv zuhören*" (active listening), students brainstormed ideas, shared their observations on the topic by adding phrases to the screen, and corrected the posts, if necessary, by means of the "Interactive whiteboard" mode. In this mode, students and teachers could write and draw together on a virtual interactive whiteboard. The results of the drawing were displayed in a special window that opens on the students' screens and on the teacher's screen. Then the students listened to the audio, each participant could play it independently and for several times to take notes on some statements. It was necessary to hear words and expressions that give emotional color to phrases ("Ja? Ah ja, Ach so, Hmhm, Verstehe, So was, Ja, Oh je, Na ja") and match them to groups of feelings: *überraschung* (surprise), *mitleid* (sympathy), *skepsis* (skepticism). After this, the students watched an authentic video from the Easy German channel, with presenters interviewing passers-by on the streets. The task for students was to analyze the most frequently used German expressions.

The internet is now an inexhaustible resource for foreign language teachers, offering many useful tools for teaching a foreign language. Teachers can use it to diversify their classes and to engage students in learning [27]. The advantage of small authentic videos from the Internet is that they address the learner's visual, cognitive and auditory channels at the same time [28]. Through the use of feature films, the learner usually hears authentic language and correct pronunciation, pitch, intonation. In addition, they see daily life and communication of people in the environment and landscape. Short videos are mostly authentic cultural products and show cultural reality, offer authentic linguistic examples, as well as communication situations on the subject of the professional world, hierarchy, everyday communication, and present examples of the use of gestures, facial expressions, posture in culturally specific communication situations [29], [30].

To work with short authentic audiovisual materials, we chose the Easy German channel on YouTube. The material on the Easy German is diverse and distributed thematically so that you can choose the most relevant for students at each stage of study. The topics include the following: "*Was wissen Sie über Deutschland*?" (What do you know about Germany?), "*Deine Nachricht an die Welt*" (Your message to the world), "*Was macht euch glücklich*?" (What makes you happy?).

The acquisition of LCC by students with the help of the sources is possible only if the teacher's work is methodically and competently structured [31]. Many researchers have experimentally proven the importance and effectiveness of preparatory work with audio text [32]. Pre-watching activity was to discuss the basic rules of the interview in groups, take notes, and prepare interview questions. After watching the video, each group compared their own answers with those mentioned in the video and discussed the most interesting points. Alternatively, students could pause the video and discuss each answer one by one. As a follow-up activity, students recollected the answers of the interviewees when they saw a video screenshot. The format of short video allowed students not to lose attention, to focus on what they see, and to remember important moments of the interview.

The experience of teaching students by means of MLL using audio-visual materials has proved that difficulties mostly occurred in understanding target language authentic speech. Of course, the video series helped to understand the conversation, but still the students had certain difficulties in understanding due to the fact that interviewees did not always speak clearly, had personal peculiarities in pronunciation, or use slang and dialects. In this way, students received a sample of the original speech in the language environment. The video was subtitled, so the students always had the opportunity to stop the video and read a phrase or a word that was not clear.

Students' assessment was conducted with the testing module, a special application for creating and editing tests, testing and analyzing the results. The program can be used to create questions of various types:

single or multiple choice, gap-filling, matching; ordering; selecting or dragging in the image area; open tasks, recording of the student's voice response. You can also limit the time of testing, specify the difficulty of the task in points and set the maximum score. We were able to test students properly and technically process the results, which allowed to significantly reduce the processing time and ensured that there were no errors in the assessment.

3. RESULTS AND DISCUSSION

At the ascertaining stage of the experimental test (organizational and diagnostic), based on the defined criteria and levels of future specialists' LCC formation, the diagnosis of the state of LCC formation in the control and experimental groups was carried out. In general, the results of the diagnosis have shown that the students' linguo-cultural knowledge and communication skills are characterized, mostly, by a low degree of completeness, consistency, awareness, and effectiveness. Quantitative results of the experiment are presented in Table 1.

Table 1. Levels of LCC at the ascertaining stage of the experiment

Group	Level	LCC criteria	
		Cognitive	Communicative
CG	High	24 (25.3%)	21 (22.1%)
	Medium	35 (36.8%)	44 (46.3%)
	Low	36 (37.9%)	30 (31.6%)
EG	High	23 (25.5%)	20 (22.3%)
	Medium	34 (37.8%)	45 (50%)
	Low	33 (36.7%)	25 (27.7%)

The formative stage of the experiment involved the creation of an artificial LCE with the help of MLL to form the future specialists' LCC. The researchers used various features of the MLL, including audio and video formats, an interactive whiteboard, a questionnaire program, and other MLL capabilities. The control group was taught according to a standard program.

Clarification and verification of the objectivity of the results of the implementation of MLL for the formation of future specialists' LCC took place at the control stage of the formative experiment. To verify the effectiveness of the MLL using, the final monitoring as seen in Table 2 was organized to reveal changes in the indicators of the LCC of the future specialists. The greatest results were achieved by students of both groups with the medium level of LCC formation.

Table 2. Levels of LCC at the control stage of the experiment

Group	Level	LCC criteria	
		Cognitive	Communicative
CG	High	26 (27.4%)	24 (25.26%)
	Medium	37 (38.9%)	45 (47.36%)
	Low	32 (33.7%)	26 (27.36%)
EG	High	32 (35.5%)	27 (30%)
	Medium	42 (46.7%)	54 (60%)
	Low	16 (17.8%)	9 (10%)

Comparison of the results of the experiment as shown in Figure 1 and the dynamics of change proves the effectiveness of implementing the MLL in the process of developing the LCC of future professionals. The data based on the summaries of the results for both criteria are displayed. It can be also stated that the changes in the control group were lower than in the experimental group.

To verify the effectiveness of the experiment and prove the validity and reliability of its tools, the method of mathematical statistics was used. The reliability of the obtained results was confirmed by the Fisher's coefficient which is used to compare two samples in terms of frequency of the effect under study, i.e. the high level of LCC. The significance of different statistical samples was calculated according to (1).

$$\varphi_2 = (\varphi_1 - \varphi_2) \times \sqrt{\frac{n_1 \times n_2}{n_1 + n_2}} \quad (1)$$

where, φ_1 is a value corresponding to a higher percentage, φ_2 is a value corresponding to a smaller percentage, n_1 is number of observations in the sample 1, n_2 is number of observations in the sample 2.

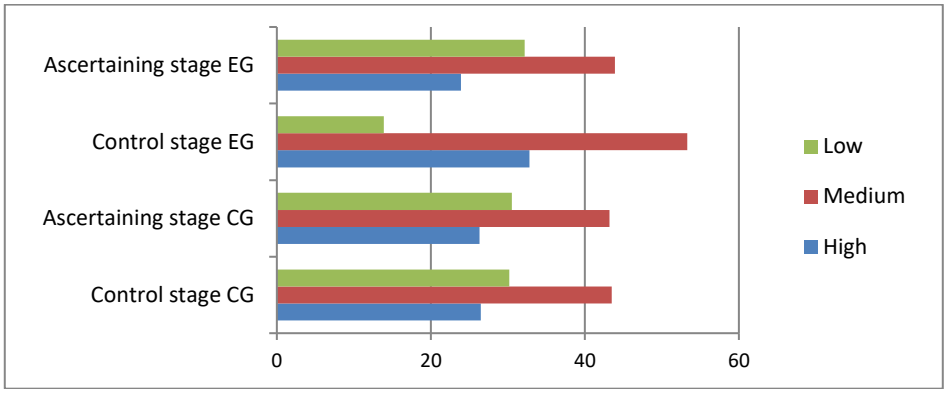

Figure 1. Comparison of LCC levels in the ascertaining and control stages

It is worth studying how much the number of students with a low LCC level has decreased. Thus, in the experimental group (φ_1), 17 students have revealed an increase in the level of LCC, which is 18.9% of students. In the control group (φ_2), 4 students have shown the same effect, which is 4.2%. The values corresponding to the percentages in each group are determined: $\varphi_1 = 0.899$ for 18.9%, $\varphi_2 = 0.413$ for 4.2%. The results of the calculation are presented in Table 3.

Table 3. The results of the calculation

Fisher' coefficient - φ		
	Angle φ	%
φ_1	0.899	18.9
φ_2	0.413	4.2
n_1	90	17
n_2	95	4
φ_{emp}=	3.303	p<0.01

The critical values for the Fisher's criterion - φ are: 1.64 for $p \leq 0.05$; $\varphi_c = 2.28$ for $p \leq 0.01$. The value of φ_{emp} exceeds the corresponding value for the level of 1%, therefore, it can be concluded that there is statistical significance of differences between the levels of LCC in terms of two criteria in the control and experimental groups, which proves the reliability of the results. Thus, the research on the development of LCC of future specialists shows significant changes, which confirms the productivity and need for such type of teaching in universities.

The obtained results confirm the hypothesis about the effectiveness of introducing a MLL into the process of learning a foreign language. During the research it was proved that the use of such an innovative multifunctional resource helps to create an artificial LCE in a regular classroom in a non-target language country [2]. Integrated use of MLL capabilities allows improving the success and quality of students' LCC development [20], [21]. Students' learning and cognitive activity is enhanced due to interactive tools such as animation, video, sound, text, i.e., important tools of the integrated multimedia environment [13]. An important technological component of the MLL is the appropriate software that allows distributing audio, audio-visual and/or textual materials to any number of students with a wide range of potential feedback mechanisms between the teacher and students, or students among themselves [12]. Multimedia hybridity helps the researchers make the MLL very interesting and diverse for students, focus their attention on studying different topics, activate all channels of information perception, which contributed to better learning of new material. Students' motivation is a key factor in learning a foreign language [11], [16], which we confirmed during the experiment and when verifying its results.

To create an artificial LCE, authentic audio and video materials were used as a source of extralinguistic information [18], [24], [27], [30], [31]. Using authentic audio texts as examples, the researchers tried to familiarize students with the peculiarities of the use of modal particles by native speakers, which is very typical for German and makes the speech of learners closer to the authentic one. In this way, students learned to express their thoughts and feelings in a foreign language in intoned and emotional way.

The experience of using short videos was even more interesting. Short videos are mostly authentic cultural products and show cultural reality, authentic linguistic examples, as well as everyday communication situations, and give examples of how to use gestures and facial expressions [22], [29], [30]. The short format

and subject matter of the videos allowed focusing on original speech samples related to a particular context. The methodology of video processing developed by the authors of the study allowed students to acquire the necessary linguo-cultural knowledge and communication skills, expand their vocabulary and language repertoire.

The use of authentic speech also had its drawbacks. The video certainly helped students to understand the conversation, but they still had some difficulty understanding it because the speakers did not always speak clear literary language, had unusual pronunciations, or spoke in dialects. Students could use subtitles to help with comprehension, but their attention would be diverted to reading the subtitles. Working with subtitled videos requires another study and methodically developed implementation in the language learning process.

Experience with MLL has shown that the full range of capabilities of such a media hybrid requires careful preparation, high computer literacy of the teacher, and high-quality methodical support. During the experiment, some topics from the curriculum and MLL modules were used, but the systematic use of MLL in the learning process would have even more advantages. The practical contribution of this study is in the positive experience of using MLL to create an artificial linguo-cultural environment, which is a prerequisite for successful and effective foreign language learning and the formation of students' LCC. The research results have been implemented in the academic process of Donetsk National Technical University. The teachers of Language Training department effectively use the set of tasks designed by means of MLL in the courses on English Language, German Language, and Foreign Language for Specific Purposes. The experience of successful implementation of MLL demonstrates that it is possible to support productive learning process by multimedia software systems. With targeted methodological support and fair distribution of time resources, foreign language teachers can create a favorable LCE in the classroom. This can enable effective learning for those who are unable to visit the country of the target language. Wider use of this technological base with proper support and teachers' training, development of well-designed curricula with the inclusion of multimedia laboratories can significantly help ensure the quality of foreign language teaching at universities.

4. CONCLUSION

Linguo-cultural competence integrates communicative knowledge and skills with the ability to understand and interact with representatives of another linguo-cultural society. Mastering a non-native language in specific conditions when students lack the possibility of communicating with native speakers should take place in the context of artificially created linguistic and cultural space of a target language – a linguo-cultural environment. Modern educational multimedia software sets are able to provide the teacher with many opportunities to create an artificial LCE in the university classroom, when students do not have the opportunity to immerse themselves in the authentic target language environment. The use of multimedia technologies in the teaching process allows teachers to enhance students' motivation to learn a target language, improve learning interactivity, get quick feedback and control the pace of learning for students showing different performance, and stimulate students' interest and willingness to be creative and independent. Experimental verification of the effectiveness of the MLL has shown that due to the integrated use of multimedia students have a sufficient level of LCC, can use traditional verbal and nonverbal means of communication, and have a wide range of language means. The reliability of the obtained results is confirmed by the Fisher coefficient. The major findings lead to the conclusion that the use of audio and video formats of the MLL makes the process of learning a target language more exciting and dynamic and enables students to use all channels of information perception. The prospects for further research include using other services and modules of the MLL in teaching target languages, as well as the use of MLL for more autonomous and independent learning of a foreign language by students, since the number of class hours is often limited by the curriculum. Proper support and training of teachers, development of well-designed curricula with the inclusion of MLL can significantly help ensure the quality of foreign language teaching at universities.

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