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Use of Mobile Applications for Foreign Language Lexical Competence Formation

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Abstract

The article deals with the problem of foreign language lexical competence formation of non-philological specialties students, which is the basis for foreign-language communicative competence and a compulsory component of a future specialist's training. The relevance of using mobile technologies in the process of teaching students a foreign language to increase the qualitative level of lexical competence is substantiated. The analysis of mobile applications for the study of a foreign language has shown that there is no unambiguous approach to their development and implementation, focused on the specifics of future students' professional activities. As a result of the study, the structure, functionality, and design of a mobile application for the study of English by students of non-philological specialties were developed. A mobile application for developing the English language lexical competence for the Android operating system with the help of the integrated Android Studio mobile application development environment has been developed. Experimental testing of the effectiveness of applications in foreign language classes for mobile applications focused on the specifics of students' future professional activities has shown the positive impact of specialized mobile applications on the level of students' knowledge of the foreign language vocabulary.

Keywords: Mobile learning, Mobile application, Foreign language lexical competence, Higher education, Teaching a foreign language, Information and communication technologies.

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Introduction

The integration of Ukraine into the world community requires future specialists to master proficiency in foreign languages. At the same time, scientists point out that the number of hours spent on studying a foreign language in higher education institutions of Ukraine is not sufficient to form the foreign language communication skills (Osadchyi & Symonenko, 2017). There is a need to improve the methods, tools, and technologies of teaching a foreign language.

A large number of scientific works devoted to the problem of information and communication technologies' use in the process of teaching a foreign language in institutions of higher education confirms the fact of linguodidactics' informatization. In addition, the development of mobile technologies, along with numerous mobile applications, promotes the innovative use of mobile technology in higher education. However, Ukrainian scientists point out that, despite the availability of mobile phones among students, mobile learning is not widely distributed in Ukrainian higher education institutions (Gorbatyuk & Tulashvili, 2013). Therefore, it is relevant to study the theoretical and practical aspects of mobile applications' introduction as a means of mobile learning in the educational process for the development and acquisition of foreign language communicative competence by students.

Literature Review

In pedagogical science, considerable attention is paid to the problem of students' foreign communication skills formation. Theoretical and methodical principles of students' foreign language communicative competence formation were studied by Osadchyi and Symonenko (2017); Shcheglova (2016) and others (Gorbatyuk & TulashvIli, 2013). The peculiarities of foreign language lexical competence formation of students in higher education institutions are covered in the writings by Smolina (2012), Yarema (2012), Ternavs'ka and Shauerman (2015). Studies in the field of mobile learning and the use of mobile devices in the learning process were performed by Qing-Ke and Hwang (2018), Sarrab et al. (2017), Yangcun, Liao, and Ren (2018), Attewell et al. (2008), Hsu and Ching (2013), Bykov (2018), Hurenko et al. (2017), Trius, Franchuk, and Franchuk (2012), Jung (2015), Jabbour (2014). The prospects of using mobile applications for the formation of foreign language competence are considered in the works of Jarvis and Achilleos (2013), Liu and Chen (2015), Titova (2012), Dumachev and Smolina (2017), Titova and Avramenko (2013), and Varshavskaya (2015).

Despite the large number of scientific papers that highlight the problem of mobile learning, the use of mobile devices in the learning process and the formation of foreign language lexical competence, issues related to the theoretical foundations of mobile applications' use in the educational process of higher education, the method of using mobile applications, the development of specialized mobile applications focused on the specifics of future professional activities of students still remain relevant.

The aim of the article is to determine the role of mobile applications in forming foreign language lexical competence of students in higher education institutions, to determine the theoretical and methodological conditions of its formation by means of mobile applications and to carry out an experimental verification of applications' effectiveness of mobile applications focused on the specifics of future students' professional activities in foreign language classes.

Theoretical Bases

The generalization of theoretical work on psycholinguistics and pedagogy has allowed creating an expanded definition of communicative competence. Communicative competence is defined as "the ability of a person to make and maintain the necessary contacts with other individuals. The competence includes a set of knowledge, skills, and abilities that provide effective communication. This kind of competence involves the ability to change the depth and range of communication, understand and be understood by partners in communication" (Zhukov, 1990, p.49). In the work by Fedorenko (2002), the following components of communicative competence are singled out: language, linguistics, lexical, grammatical, and phonetic ones.

The analysis of the scientific works by Greb (2015), Smolina (2010), Fedorenko, and Yarema (2012) convinced us in the fact that one of the leading determinants of communicative competence of students is lexical competence, which is in the conscious and motivated mastery of language lexical means and the ability to use them. The most complete notion of lexical competence is defined in the work by I. Yarema. The lexical competence is "the ability of an individual to use language vocabulary on the basis of lexical knowledge, instantly taking from the long memory the standard of the word depending on the particular language task, appropriately using the chosen expressions, sayings, proverbs and phraseological units within the framework of professional development, as well as to support the functioning of these skills at the required level and to continuously monitor the lexical content of the speech" (Yarema, 2012).

Lexical competence is the linguistic basis of professional and communicative competence, and can be considered as a dynamic unity: lexical competence is formed in the process of students' communicative activity, and communicative competence is improved when the lexical competence is formed, so, their formation is interdependent (Yarema, 2012; Ternavska & Shauerman, 2015).

Therefore, the content of teaching a foreign language in institutions of higher education of non-philological specialties should form foreign language communicative competence of students with a necessary consideration of future professional activities' specifics.

It should be noted that the formation of foreign language lexical competence of students in the process of learning a foreign language is a complex process of creating the necessary conditions for purposeful replenishment of vocabulary; developing the skills of identifying lexical units (word, idioms, "full sentence") in the text, the development of lexical skills, the ability to get verbal associations for speech communication (Smolina, 2010).

In the studies by I. Bim (2007) in the field of teaching a foreign language, it is determined that in the midst of the course of studying a foreign language, the problem of increasing the effectiveness of vocabulary learning arises. This is due to the fact that students accumulate a certain vocabulary and it becomes increasingly difficult for them to remember new words and keep them in memory. The process of forgetting lexical units begins. In connection with this, the quality of speech (both oral and written) deteriorates, because it is in direct dependence on the volume of vocabulary. In addition, the range of expanding communication situations requires more lexical units and stronger lexical skills. Consequently, there is a need to increase the vocabulary of students, to consolidate and preserve lexical units in memory and to organize more intensive training of their use for the creation of independent linguistic works, for the quality of translation, which is impossible without changing not only the content of learning, but also the very approach to teaching this subject. It is necessary to get

rid of outdated textbooks and forms of work, instead to introduce new information technologies and achievements of scientific and technological progress.

New opportunities open in connection with the advent of mobile technology. The main benefits of mobile technology for learning include the mobility of users, relatively high computing power and the ability to stay connected to the Internet. These opportunities provide significant potential for innovative use of mobile technology in education. In addition, mobile devices are gaining popularity due to the availability of a large number of easy-to-use mobile application software (Hsu & Ching, 2013).

V. Bykov (2018) notes that the development of mobile technologies directs the development of education through the transition from remote technologies to open ones. The questions of mobility for modern psychological and pedagogical science should be considered both as a subject of research and as a means of professional people's activity.

A unique MoLeNET project, in its general approach to the introduction and support of mobile learning in the education sphere, was attended by about 40,000 students and over 7,000 staff members in British colleges and schools in 2007-2010. The results of the MoLeNET project were: general definitions, technical and pedagogical recommendations for support, development of methodological materials (Hsu & Ching, 2013). There are several definitions of mobile learning in the scientific literature that are based on the technological features of mobile devices and the didactic capabilities provided by these technologies. According to the MoLeNet project, mobile learning is the use of handy portable mobile devices and wireless technologies to facilitate, support, optimize and expand learning processes (Dumachev & Smolina, 2017).

S. Titova (2012) assumes that mobile learning is an activity carried out regularly using compact, portable mobile devices and technologies, and allows students to become more productive by communicating, obtaining or creating information. This definition, in our opinion, reveals the essence of mobile learning more fully.

According to the study by Attewell et al. (2008) conducted in the UK, it was concluded that mobile learning is changing the entire learning process, as mobile devices not only modify the forms of material presentation and access to it, but also contribute to the creation of new forms of cognition and mentality.

Mobile learning involves the use of mobile technologies either by a person himself or in conjunction with other information and communication technologies (ICTs), which enables the user to carry out training anytime and anywhere. The functionality of smartphones and mobile phones ensures the versatility of such learning: people can use their portable devices to access educational resources, communicate with other people, create their own content, etc.

In a paper by Troussas, Virvou, and Alepis (2014) a mobile tutoring framework, built up in the context of student collaboration, is presented. Collaborative student groups are created with respect to the corresponding user models. The results confirmed the usefulness of collaborative learning.

The study by Titova and Avramenko (2013) showed that 85% of students have a smartphone, from 15% of students with phones, 99% also have other mobile devices - a player, tablet, or netbook. The percentage of students using their laptops or tablet PCs outside the home is 77%. According to the

questionnaire, 60-80% of students use a calendar of events, a camera, a player and other mobile device applications daily. Such figures show not only the psychological readiness of students to the introduction of mobile devices into the learning process but also the need for methodically thought out and planned use of familiar tools in different learning situations. The results of the questionnaire showed that 97% of respondents consider the introduction of mobile devices in the learning process as necessary, and 80% of respondents use mobile devices daily in education. The results prove the high level of mobile competence of youth and the readiness of students to use mobile technologies in education.

The UNESCO World Program for mobile education suggests that the mobile device market is enormous, and the availability of mobile devices for all segments of the population is growing day by day, making them the most popular ICT tool. This fact makes mobile learning much more accessible than before (UNESCO, 2013).

In general, most researchers come to the conclusion that mobile learning is a natural evolution of e-learning, but the uniqueness of mobile learning versus traditional methods of electronic and mixed learning is that schoolchildren and students are not primarily tied to a certain time and place, having access to the educational material at any convenient time (Attewell et al., 2008; Hsu, Ching, 2013; Bykov, 2018; Hurenko et al., 2017; Trius, Franchuk, Franchuk, 2012; Jung, 2015; Jabbour, 2014).

Methods

Our research uses the following methods: analysis and synthesis of philosophical, pedagogical and psychological literature, which make it possible to clarify the basic concepts of the research; systematization and generalization of educational-methodical ideas on the issues of formation of foreign language lexical competence of non-philology specialties' students by means of mobile applications; generalization of own pedagogical experience in the system of professional education; structural-functional, system analysis; algorithm theory; object-oriented design of a mobile application for the study of the English vocabulary; interpretation of the research work's results.

Results and Discussions

Use of mobile applications in the process of learning a foreign language

The role in the everyday and professional life of foreign communication skills is extremely important, that is why the foreign language is mandatory for study by all future specialists. We agree with V. Osadchy and S. Symonenko, that "the high level of language proficiency certainly contributes to career growth, raising the intellectual and cultural level of a specialist, and easy adaptation of him/her in a foreign environment" (2013). However, scientists point out that teachers of a foreign language need to organize the classroom and independent work in such a way as to create favorable conditions for future professionals to successfully master the foreign language at an adequate level (Gorbatyuk & Tulashvlli, 2013).

Mobile devices offer great opportunities for organizing classes of a foreign language. Working with smartphones and tablets in a foreign language course allows working with authentic materials, encouraging students to have creativity, mobility, and flexibility in thinking (Yangcun, Liao, & Ren, 2018). The tasks involving the use of mobile devices contribute to the development of communicative, intercultural, informational, cognitive, and social competencies. Mobile devices combine work and education, enable the

collection, evaluation, and processing of information anytime, anywhere, and in real-world learning (Sarrab et al., 2017).

Working with mobile devices in foreign language classes facilitates person-oriented learning, provides many opportunities for differentiated, autonomous, and individual learning, and promotes the introduction of innovative forms of teaching and expanding traditional forms of a foreign language teaching.

At the same time, mobile applications as means of passive reflection of educational material do not have a fundamental novelty in the didactic plan. The interactivity of mobile applications is fundamentally new to the field of learning, and it provides opportunities for the active learning of lexical units and the development of lexical unit identification skills, which can significantly reduce the time of foreign lexical competence formation.

We draw attention to the fact that a lesson should combine the use of mobile devices with the developed methods of training. The tasks presented in the educational literature on the development of all types of speech activity (reading, speaking, writing, and listening) can also be performed by students on their smartphones and tablets. The teacher accompanies this process: explains, helps, checks the tasks, advises, etc.

Analysis of modern technologies in the field of learning a foreign language using mobile technologies

In the course of mobile learning, virtual learning environments are used that allow grouping the learning process participants in order to further fulfill certain roles and tasks, as well as assess their success within the structure of the course. Virtual learning environments are divided into the following: having a portal for the teacher (Moodle, Edmodo, Fronter, Blackboard, Ilias, Smart School, etc.) and without portals (LinguaLeo, DuoLingo, Busuu, etc.) (Shcherba, 2017). After the availability criterion, it is possible to divide into: paid (Frog, Kaleidos), with paid and free packages (Easygenerator, etc.), free (Edmodo, SLoodle) (Shcherba, 2017). Virtual learning environments are used to learn theoretical knowledge and skills development. Pay attention to the benefits of Edmodo environment: free; mobile version; user-friendly interface. While performing Edmodo tasks, students can attach media from their PCs in text, graphic, video, or audio formats (Shcherba, 2017). In our viewpoint, the use of virtual learning environments as platforms is effective, which facilitates the combination of mobile learning with classroom work.

Significant methodological potential for the formation of students' lexical competence in non-philology specialties is the Kahoot game-based learning platform, which enables the creation of multi-used quizzes (Shcherba, 2017). Students can respond to teacher-made tests on tablets, laptops, and smartphones by using any device that has access to the Internet. Created in Kahoot tasks allow including photos and video clips in them. The pace of performing quizzes, tests are regulated by setting a time limit for each question. To participate in the test, students must open the service and enter the PIN that the teacher provides. The Kahoot application can be used to train and consolidate the use of lexical units by students and receive feedback.

Our analysis of mobile applications for learning a foreign language suggests that today a significant number of mobile applications and programs for learning a foreign language are aimed at the formation and development of lexical skills, namely: free (Duolingo, Memrise, HiNative), paid and free content (Lingualeo, Easy Ten, Busuu, Effortless English, LingQ, Anki, British Council, Words) are developed.

It should be noted that, firstly: with the exception of Lingualeo, all other mobile applications have no ability to add content and they are not adapted to the formation of professional lexical competence; and secondly: not all the programs have language material, various types of tasks, do not fully use the technical capabilities of modern mobile devices.

During the study, we also became interested in professional-oriented applications for learning English. Unfortunately, we have to admit that developers are paying little attention to the creation of applications that contain professional-oriented texts for learning a foreign language, and there are no free apps at all.

Development of a mobile application for the formation of foreign language lexical competence of computer specialties' students

Over the past half-century, the role of the English language itself has grown as an indicator of human progress and education. More than 80% of all information in more than 200 million computers around the world is stored in English. Instructions for computer programs and the programs themselves are often only in English. More than half of the world's scientific periodicals are published in English (Kasatkina & Lagutina, 2014).

The study of a foreign language includes two most important aspects – cognitive (the ability to perceive and process perceptions of external information) and communicative (the ability to enter into communication) (Saienko, 2013). Without a cognitive element, that is, without knowledge of words, stable phrases and expressions, it is impossible to move on to further communications or conversations in a foreign language, since phrases and sentences are constructed from words, and, the more vocabulary, the easier it is to understand the written text and express thoughts (Saienko, 2013). The development of a mobile application for the formation of foreign language lexical competence of non-philological specialties' students is actual.

For the students of the computer training profile at Berdiansk State Pedagogical University, a mobile application has been developed: an individual system for the formation of foreign lexical competence. The mobile application allows the formation of computer terminology vocabulary and lexical skills (intuitive-correct understanding and use of foreign language vocabulary on the basis of verbal lexical connections between audio-speech motor and graphic forms of the word and its meaning, as well as connections between words of a foreign language (Smolina, 2010)).

The mobile application contains basic vocabulary, as well as thematic ("Computer Networks", "Programming", "Web-terminology") vocabulary groups. There are two modes of work available in the application: an English-Russian dictionary complemented with transcription, word pronunciation and contexts of use and exercises on the formation of lexical skills. All contexts are voiced and translated into Russian. The program contains individual interactive components, for example, the success statistics of the user is conducted.

The dictionary, in addition to describing the lexical meaning of the word, contains examples of lexical units' use, which allows getting information about words, phrases, and expressions within the context. In addition to transcription, the dictionary contains audio recording of the words' pronunciation.

The mobile app's main screen contains a list of available dictionaries. Clicking the "plus" sign opens the word-add screen. Selecting any item in the list opens a list of words. Selecting any item in the list opens the complete information with the audio file.

The application helps to intensify the memory of new words of non-philological specialties' students, to form skills of their spelling and perception of hearing. It contains three types of tasks, after which the user can move the word into the list of the studied vocabulary.

Hata! Başvuru kaynağı bulunamadı. shows the screen of the mobile application in the modes: "Select", "Speak", "Write", where the user should choose or pronounce the word correctly, or print the word to be studied. The bottom of the screen contains a panel with three opening buttons: word help, a screen with a list of words, the program setup screen.

The mobile app settings window contains mode switches, pronunciation settings, auto-switch. Dictionaries are provided in three ways: in manual mode, with the application form filling, by creating a JSON file and SQLite database.

The app is developed with the free Android Studio integrated application development environment. The developed mobile application has a friendly interface and efficient functionality. Characteristic features of the application are dynamism, visibility, audio conferencing, and the ability to add own dictionaries.
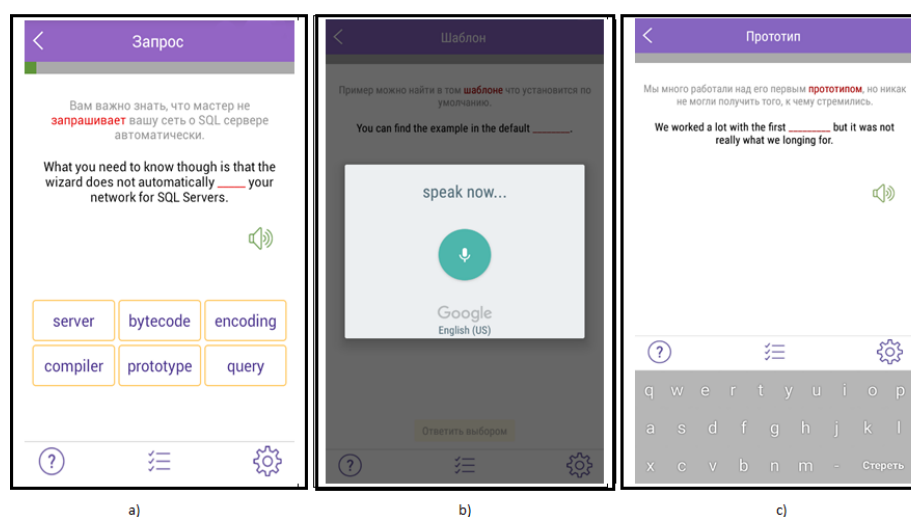

Fig. 1. Study of words in the mode: a) "Choose", b) "Speak", c) "Write".

Use of a foreign language mobile application in the process of studying for forming lexical foreign language competence allows to store lexical units; reproduce them on the basis of graphic symbols; perform various lexical exercises; organize a fast search of the necessary lexical units; make high-quality translation; carry out automated self-monitoring; implement informational interaction in the information and communication subject environment, visualization of educational information, choice of individual mode of work.

It is known that for the formation of lexical skills, the following exercises are performed: reading aloud, filling of missed lexical units in the text, completing sentences, answering various types of questions (Smolina, 2010). All these exercises can be done with the help of the developed mobile application. In addition, the developed application can be used at each of the stages of the vocabulary study: indicative-preparatory, training, and situational-variational.

Thanks to the developed mobile application for learning a foreign language, which has open-source code, teachers and students have the opportunity to update existing dictionaries and make new ones. With the help of the addition of own content, the created mobile application can be used to form a foreign lexical competence of non-philology specialties' students.

An experiment was conducted in Berdiansk State Pedagogical University from September 2016 to June 2018 to test the effectiveness of the developed mobile application's use from the "Foreign Language" disciplines.

Before the experiment was conducted, the assumption was made that the use of the developed mobile application during the study of foreign (English) language by students of the Faculty of Physical and Mathematical, Computer and Technological Education will contribute to the formation of students' lexical competence and positive motivation to study the foreign language. Students of the following specialties attended the experiment: Professional education (Computer technologies; Power engineering); Secondary education (Mathematics; Physics; Labor Training and Technology; Informatics).

On the analysis basis of psychological-pedagogical and methodological scientific works for each of the components of the lexical competence of non-philological specialties' students, the criteria and indicators (Smolina, 2010) are characterized.

Cognitive criterion characterizes the learning of professional vocabulary: characterizes the level of professional terminology learning, the level of lexical skills' and abilities' formation. The motivational-value criterion characterizes the level of motivation development of the educational activity in the study of foreign language students using a mobile application. Its indicators: educational motivation for foreign language studying by students ("Directions of educational motivation" by T. Dubovytska), the motivation of success ("Motivation of success and desire to avoid failure" A. Rean). The reflexive criterion characterizes the developed skills of the activity's analysis, self-analysis and self-improvement in the study of a foreign language by students using a mobile application. Its indicator is a reflection of an educational activity ("Diagnostics of the level of reflexivity development" by A. Karpov).

In order to confirm the put forward hypothesis, the following tasks were solved in the course of the experiment: the initial level of lexical skills' formation in the foreign language of students was determined within the themes of professional vocabulary; experimental training was conducted using the developed mobile application; the analysis of its results was carried out. Experimental testing included two stages: ascertaining and forming.

At the various stages of the experiment in the pedagogical study 142 students of the Faculty of Physics and Mathematics, Computer and Technological Education at Berdiansk State Pedagogical University took part. According to the tasks of the pedagogical experiment, an experimental group that numbered 72 students and a test group of 70 students were formed.

The statistical analysis of the ascertaining experiment's results showed that the level of training in the experimental and test groups practically does not differ according to the criteria studied and to indicators of motivational-value, cognitive, and reflexive components. The statistical significance of the differences in the results obtained is confirmed at the significance level of 0.05 according to the Student's criterion for averaging.

Analysis of statistical data showed that the process of components' forming of lexical competence occurred more dynamically in the experimental group, which is confirmed by a higher relative increase in the indicators of average and high levels of formation and a more rapid decrease in the growth of low-level indicators. The change in the formation levels of the foreign language lexical competence of the experimental group's students from low to high ones confirms the efficiency of using the mobile application.

Consequently, the results of the pedagogical experiment confirmed the hypothesis of the study as for the effectiveness of using mobile applications for the formation of students' lexical competence and positive motivation to study a foreign language.

Conclusion

In today's world, mobile devices play an important role in providing training and expanding access to education. The emergence of social media, the popularity of mobile applications and the free distribution of educational and other materials contribute to the development of mobile learning.

The combination of the use of traditional learning methods in the foreign language learning process and mobile learning enables to intensify the students' independent activity, increase their cognitive activity, and facilitate the individualization of education. At the same time, it is important to direct the process of obtaining educational information through mobile technologies, to ensure its quality, reliability, and relevance. The development of specialized mobile applications helps to make the learning process of a foreign language by students of non-philological specialties at higher education institutions convenient and effective.

The effectiveness of using a mobile application for the formation of foreign lexical competence in comparison with traditional methods of training is confirmed by the experimental research. The results testified that the participants of the experimental group showed better results of the foreign lexical competence formation and confirmed the effectiveness of using the mobile application.

We consider to be promising the addition of a mobile application by means of forming the phraseological component of the foreign language communicative competence of non-philological specialties' students.

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