

THEORY AND METHODS OF FOREIGN LANGUAGE TEACHING

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Digital glossary as an instrument of the effectiveness improvement of CLIL model at the technical (aviation) university

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Importance. The study presents the results of implementing a methodological model for content and language integrated learning (CLIL) in a technical university, utilizing a digital glossary as both a repository for professional and linguistic data and a pedagogical instrument, aimed at enhancing the learning experience within the context of the aviation English course. The purpose is to foster a consistent improvement of students' foreign language speaking and related language skills, thereby contributing to the professional development of future aviation professionals capable of effectively carrying out their duties in accordance with International Civil Aviation Organization requirements.

Materials and Methods. This study utilizes methods such as analyzing relevant scientific literature and documentation from the International Civil Aviation Organization (ICAO), which govern the requirements for aviation personnel language training. Additionally, online platforms suitable for developing a digital glossary are compared and selected. Furthermore, an experiment is conducted and observations are made.

Results and Discussion. Based on the experience of implementing digital technologies in the process of foreign language teaching an experimental training has been conducted on the basis of Saint-Petersburg State University of Civil Aviation.

Conclusion. An introduction of digital glossary as an element of model in the content and language integrated learning process provides the conditions for development and improvement of foreign language proficiency and professional knowledge and, consequentially, provides a better qualification of future civil aviation pilots.

Keywords: professionally oriented learning, content and language integrated learning, aviation English, digital technologies, glossary

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ТЕОРИЯ И МЕТОДИКА ОБУЧЕНИЯ ИНОСТРАННОМУ ЯЗЫКУ

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Цифровой глоссарий как инструмент повышения эффективности модели CLIL в техническом (авиационном) вузе

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Актуальность. Представлены результаты внедрения методической модели предметно-языкового интегрированного обучения (CLIL) в техническом университете на основе цифрового глоссария в качестве носителя профессиональной и языковой информации и дидактического инструмента с целью интенсификации процесса обучения в рамках курса «Авиационный английский язык», обеспечения последовательного совершенствования как речевых умений иноязычного говорения, так и сопутствующих языковых навыков и, следовательно, повышения квалификации будущих специалистов, достаточной для осуществления успешной профессиональной деятельности в соответствии с требованиями Международной организации гражданской авиации (ИКАО) по общему и авиационному английскому языку.

Материалы и методы. Использованы такие методы, как анализ научной литературы по теме исследования и документов Международной организации гражданской авиации (ИКАО), регламентирующих требования к языковой подготовке авиационного персонала, сравнение и подбор онлайн-платформ для создания цифрового глоссария, эксперимент и наблюдение.

Результаты исследования. На основе опыта включения цифровых технологий в процесс обучения иностранному языку было проведено экспериментальное обучение на базе Санкт-Петербургского государственного университета гражданской авиации.

Выводы. Включение цифрового глоссария в качестве элемента модели в процесс предметно-языкового интегрированного обучения создает условия для развития и совершенствования уровня владения иностранным языком и профессиональных знаний и, следовательно, обеспечивает большую квалификации студентов – будущих пилотов гражданской авиации.

Ключевые слова: профессионально-ориентированное обучение, предметно-языковое интегрированное обучение, авиационный английский язык, цифровые технологии, глоссарий

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IMPORTANCE

Reconsidering the requirements for the higher education system, as well as expanding of the list of professional and, in particular, foreign language training criteria of future specialists are the processes define the relevance and significance of this study. In such conditions, a foreign language is being increasingly shifted into the field of profession and specialty, combining special studying disciplines and becoming involved in the process of teaching them. In our opinion, the purpose of modern professional training of a specialist is manifested in this interdisciplinary orientation which implies the development and formation of both professional knowledge and related speech and language skills. This statement seems to be true in relation to the aviation industry, where the level of English proficiency determines not only the professional qualifications of a civil aviation specialist, a pilot or an air traffic controller, but a potential safety of flights.

At the same time, both Internet development and globalization open up new opportunities for professional activities and professional education, and foreign language training is not an exception. This field is constantly being improved, and, as a result, new forms of training organization are emerging. The change in methodological approaches is supported by new learning opportunities: multimedia, the use of the Internet, mobile communication tools, as well as the emergence of a “new type” of students focused on the active use of modern information technologies and learning tools. All this makes it necessary to find new solutions in the organization and implementation of the process of foreign language training, taking into account the characteristics (ethnocultural, social, professional) of target audiences in Russian Federation and other countries.

In our opinion, one of the most productive ways to solve the above-mentioned problem can be found in the ideas of Content and language integrated learning (CLIL) which provides a simultaneous language and professional training, whereas the language is acting as a didactic tool of a professional education. Having defined CLIL, D. Marsh describes the cases when a foreign language is used in teaching individual disciplines or modules within them in order to achieve a simultaneous perception of a specified professional content and a foreign language [1]. Having analyzed the work devoted to CLIL methodology [2–6], the following advantages of this approach may be highlighted:

- an opportunity of forming professional knowledge through and on the basis of foreign language; a use of language as a didactic tool of professional education;
- several options for implementing this approach, taking into account the professional or linguistic orientation of the learning process (in the “hard CLIL”, “soft CLIL” models);
- a dual focus on the development of linguistic and cognitive abilities of students;
- a use of professionally relevant content as a means of additional motivation for students to study foreign languages;
- an opportunity of putting freshly obtained knowledge and skills into practice with the help interactive educational activities;
- an acquisition of cooperation, decision-making and teamwork skills.

Addressing the Russian experience on CLIL introduction, this approach is already successfully implemented in the model of bilingual teaching of a professional discipline¹, in the framework of the model of content and language integrated learning by means of Russian and English [7], bilingual model of integrative teach-

¹ Salekhova L.L. (2008). *Didakticheskaya model' bilingval'nogo obucheniya matematike v vysshei shkole. Dr. Sci. (Education) diss.* Kazan, 447 p. (In Russ.)

ing of engineering students [8] and models of the formation of foreign language competence in the field of professional communication of future engineers², etc.

Regarding aviation industry requirements some parts of CLIL methodology have been introduced in the course of “Aviation English” for a number of aviation specialties, in order to obtain sustainable speech skills of a foreign language reading and professional knowledge of such disciplines, as “Aviation meteorology”, “Aerodynamics”, “Air Navigation”, “Radio equipment for navigation and ATM”, “Thermodynamics & Engines theory”, “Electrical engineering и avionics” [9]. The choice of foreign language reading and development of its skills as a primary purpose is initially motivated by a huge list of aviation professions, which involves correct reading and understanding technical documentation (schedules, instructions, plans, estimates, applications for materials, equipment) and its content in a foreign (English) language as a part of working routine.

It should be noted that one of the CLIL model’s component implemented in the “Aviation English” course is represented by a number of digital technologies providing students with language and professional information, as well as a greater educational autonomy. The same idea is illustrated by the results of the research [10] where Google products were successfully introduced as a part of a greater “soft CLIL” model replacing a traditional learning trajectory and giving the students more freedom for choice, creativity and professional self-development.

However, when it comes to pilots and air traffic controllers (ATCOs), skills in foreign language reading are considered as supplementary ones, whereas speaking skills are of utmost importance, as maintaining clear air-ground communication and being able to work in a close cooperation influence flight efficiency and, consequently, its safety [11]. Since 2008, International Civil Aviation Organization

(ICAO) provides a 6-level rating scale (“Holistic Descriptors & Language Proficiency Rating Scale”) based on six holistic descriptors (pronunciation, structure, vocabulary, fluency, comprehension, interactions) for an unbiased listening + speaking assessment as well as arranging the aviation English training activities in a consistent and effective manner³. According to the ICAO requirements, aviation personnel – pilots and ATCOs, must obtain the Operational level 4 of English language proficiency to perform a wide range of professional tasks and to ensure an appropriate level of flight safety. The level 4 compliancy implies a comprehensible pronunciation, intelligible fluency and delivery, and a vocabulary range sufficient to communicate on “common, specific, and work-related topics” with the ability to paraphrase in unexpected circumstances, whereas the interaction skills involve immediate, appropriate and informative responses, being able to “initiate and maintain radio exchanges” during routine and non-routine communication and dealing with misunderstandings “by checking, confirming and clarifying” [12].

Any scientific and technical processes are practically impossible without the widespread introduction and use of modern methodological approaches and technologies [13]. Speaking of modern technologies, it’s important to mention the digital ones, as they allow to implement many research and professional tasks in the shortest possible time. Therefore, implementing digital technologies in the process of training future aviation specialists is dictated by the need for technological support of both professional and language training, as well as for intensification of the educational process of the “Aviation English” course.

MATERIALS AND METHODS

The development of digital technologies has predetermined the students’ need for effective information resources in a convenient format. Among other things, the researchers note that the electronic format speeds up the process of

² Krylov E.G. (2016). *Integrativnoe bilingval’noe obuchenie inostrannomu yazyku i inzhenernym distsiplinam v tekhnicheskoy vuzze. Dr. Sci. (Education) diss.* Ekaterinburg, 450 p. (In Russ.)

³ Recommendations for Aviation English Language training Programs ICAO Cir No. 323. 2010.

searching for the desired vocabulary unit due to hyperlinks, as they quickly direct the user to the necessary information.

The study [14] shows that including digital technologies as a part of blended learning in Aviation school provide considerable opportunity to mix conventional educational settings with contemporary technological advancements and to enhance students' academic achievements across various abilities and sub-skills as well as oral communication proficiency. According to our experience, one of the digital technologies enhancing both language skills and professional knowledge formation are glossaries, dictionaries and thesauri, as the students are able not only to master vocabulary and consolidate it in the various types of speech activity, but also to with the theoretical material of professional disciplines [15]. Moreover, this type of organization and further presentation of the studying material seems optimal also because it immediately focuses students' attention on language units of aviation English, as well as on additional information revealing it.

When studying the subject of electronic and digital dictionaries, it's important to identify what dictionaries are, what advantages and functions they offer for aviation English training and CLIL methodology, in particular. An electronic (online) dictionary is a dictionary in a special machine format that functions as a part of computer software. Electronic versions of dictionaries are widely distributed today. Unlike traditional dictionaries, a digital dictionary, can contain the entire range of media objects, such as video and animation fragments, sound and music content, along with text and graphic images.

All electronic dictionaries can be divided into two types:

- automatic end-user dictionaries;
- embedded automatic dictionaries for text processing programs (information retrieval thesauri, frequency dictionaries, rubricators, classifiers, dictionaries of morphological analysis; dictionaries for machine translation), which include detailed information about the morphological, syntactic and semantic features of the functioning of the word. The number of zones of

dictionary entries varies from 1 to 100 in such dictionaries. Each zone contains a special type of dictionary information: a lemma, grammatical information or stylistic marks, zones of meaning and interpretation. A traditional bilingual dictionary offers users not only translation, but also options for the functioning of a lexical unit in context, extensive information about its grammatical features, etymology, composition, its derivatives, phraseology, and also accompanies its pronunciation options with audio recordings, illustrations [16; 17]. Some of the dictionaries of professional language can also include specific categories, known as learning descriptors, which make a word search faster and easier. According to E.G. Krylov, referring to learning descriptors is justified, as it “gives students the opportunity to present the structure of the subject area and ways to gain knowledge about it” [18].

An important feature of the electronic dictionary is its hypertextuality which is “a potential possibility of non-linear reading of the text, as well as textual unity consisting of two or more texts”, and hypertext is “an electronic form of the text consisting of fragments and footnotes that provide the possibility of non-linear reading of the text”⁴. Links embedded in words, phrases, or drawings allow any user to select a text or drawing and instantly display related information and multimedia materials on the screen. The relationship between the components of a dictionary entry is not linear. The dictionary entry has a clear logical structure with hierarchical relationships between the elements. Each information category has a strictly fixed place, a so-called dictionary “zone”. The user interested in the particular information, requests a certain parameter and gets access to individual fragments of the article. According to their request, only a single zone is activated, so there is no need to view the entire article. Consequently, the creators of an electronic dictionary can provide a fairly large number of dictionary entries, allowing the user to easily and quickly obtain any information they need, and the problems of alpha-

⁴ Masalova M.V. (2003). *Gipertekstual'nost' kak immanentnaya tekstovaya kharakteristika. Cand. Sci. (Philology) diss.* Ul'yanovsk, 123 p. (In Russ.)

betical arrangement of dictionary entries for the mass user are not of fundamental importance.

The advantages of using dictionaries of this format in the educational process can hardly be overestimated. An online or electronic dictionary, as a means of language training, has already been successfully introduced into the process of forming lexical competence in learning a foreign language [19], into the extracurricular work of engineering students and the formation of a professional thesaurus [20]. The work on the thesaurus of professional vocabulary, as well as on a set of expressions, is aimed at linking speech structures and lexical units, as well as at establishing links between words as phenomena of internal and external speech. The forms of organization of this type of work may vary depending on the level of language proficiency and learning goals [21]. Within the framework of our research, it is online dictionaries that play one of the key roles for the organization and provision of the educational process, since several interrelated components of the proposed didactic model are implemented on the basis of a personal dictionary. The ability to include additional information in the form of dictionary entries, links and illustrations, as well as the ability to quickly access and update the information provided, determines for us the choice of a service for creating MyEfe personal glossaries (<https://myefe.ru>). This glossary provides users with the ability to collect, store and edit up to 500 linguistic units necessary for studying. MyEfe has the function of “smart” words collection, that is a correction of the language unit automatic translation, setting up shared access to created glossaries by a generated link, as well as the ability to organize glossaries via tags – names assigned to each dictionary. Along with creating personal glossaries, MyEfe offers all users ready-made thematic collections of lexical units that can facilitate the collection and replenishment of a user dictionary. The service provides the possibility of memorizing the studied words and phrases using the “T-Words” built-in simulator and exercises for it.

In order to solve the problem of combining the two key components of this approach, 600

linguistic units were selected using a continuous sampling method, making up the so-called “aviation personnel professional language” – a basis of terminological and commonly used units reflecting not only the basic concepts of professional disciplines, but also actions related to the performance of professionally significant tasks for students. The most effective process of assimilation of the aviation personnel professional language and the content denoted by it is presented in the format of a bilingual digital glossary, originally implemented on the basis of the MyEfe.ru source.

The pedagogical experiment was conducted among the 2nd year students of Saint-Petersburg State University of Civil Aviation, majoring in Flight operation of civil aircraft and Flight management. The total number of participants equals 90. At the preliminary stage all of the students were instructed about aims and objectives of the forthcoming experiment and introduced to MyEfe and its functions. Afterwards, they were split into control (CG) and experimental (EG) groups. An experimental work itself is divided into 3 interconnecting parts: initial test, experimental training and final test.

Initial test stage means that along with the traditional explanation of the goals and objectives of the discipline, assessment criteria, there is an instruction held on a proper use of MyEfe, creating student’s personal accounts and setting them up. Then an assessment of the level of foreign language speaking skills formation was conducted. All the participants of the experiment were offered 5 tasks, based on the text read. The topics for the texts are chosen in accordance with a syllabus of the “Aviation English” course.

Task № 1 – Read the last passage from the text “Four forces on an aircraft” and explain the principles of thrust generation (a monologue task based on a sample)

Task № 2 – Speak about the profession of a pilot (air traffic controller, navigator), its aims, upsides and downsides. Describe the future professional sphere of civil aviation and perspectives for a pilot (a premediated monologue on a given topic)

Task № 3 – One of you is a commercial airlines pilot and the other person is an aircraft maintenance engineer, fixing an airframe. Read the text “Parts of the conventional airplane” again and discuss with your partner how a structural damage can affect aircraft performance (creating and presenting of a dialogue in a given situation)

Task № 4 – Work in pairs. Read and discuss the following statement – “Angle of attack indicators are important in terms of eliminating the hazard of runway excursion”. Express your opinion, agreement or disagreement. (conducting a dialogue/discussion)

Task № 5 – Comment on the following statement – “During the first training sessions, a pilot’s bound to learn about the four forces that act on an airplane in flight” (a task of commenting / a spontaneous monologue)

In accordance with the type of oral communication and the attitude towards the interlocutor, the speech skills of foreign language speaking were conditionally divided into the skills of monological and dialogical speech (prepared + unprepared). Monologue speech is characterized by the following skills:

- the logic and consistency of the statement;
- completeness of the statement;
- completeness of the implementation of the speaker’s communicative intent;
- expression of the communicant’s own point of view, their opinion and attitude;
- selection of language and speech tools appropriate to the situation and topic of communication;
- a variety of language and speech tools used;
- knowledge of professional “Aviation” vocabulary;
- the use of cliches, introductory constructions, connecting elements in speech;
- lexical and grammar speech formulation;
- using compensatory skills in case of entropy and/or communication failure;

- the volume and fluency of speech utterance.

Dialogue speech is represented by a list of similar skills, supplemented by expressing the communicant’s own point of view, their opinion and attitude in the dialogue, as well as a selection of language and speech tools appropriate to the situation, topic, and issues of the dialogue.

The criteria for assessing the current level of development of foreign language speaking skills correspond to the descriptors of their levels of formation are presented in Table 1.

After finishing the initial work, we started the experiment training and testing of the developed digital glossary. During 2 months all the experimental groups had “Aviation English” classes based on a technological component of the CLIL model which includes a “MyEfe” glossary, a system of exercises aimed at foreign language speaking skills development and professional knowledge formation. Taking into account the results of the initial test, it should be noted that there is a need for further improvement and development of speech skills of foreign language speaking, in particular, the selection of language and speech tools appropriate to the situation, topic and to the situation and topic of communication, the use of compensatory skills in case of entropy and/ or failure in communication and the variety of language and speech tools used. The examples of exercises:

- *finish the following navigation chart with the help of the digital glossary and describe its content;*
- *look at the scheme of the ADF basic equipment and describe it using the digital glossary;*
- *watch the video “AM and FM radio explained” on YouTube and discuss its content, using the terms and lexis from the glossary). Agree or disagree with the other students;*
- *watch the video “How Radio Waves Are Produced” on YouTube and discuss the questions to it giving proofs and ideas. You can consult with the digital glossary;*
- *project work. Find the information on the wavelength and frequency relations on the*

Table 1

Indicators of foreign language speaking skills development

Points	Indicators of the foreign language speaking skills formation
0	The speaking skills are not formed, therefore communicative intent cannot be achieved
1	Communicative intent still isn't achieved. A two-way communication is reduced to individual remarks, however there is virtually no reaction to the interlocutor's remarks. The language and speech tools used do not correspond to both situation and dialogue/monologue topic. A significant number of mistakes, that hinder communication, have been made, compensatory skills are not used
2	Communicative intent has not been practically achieved. The statement lacks logic and consistency of presentation, which makes it incomplete. The language and speech tools used often do not correspond to the situation/topic/problem. The volume of utterance is significantly lower than the professional language requirements. The speech is not fluent, with a significant number of pauses. Compensatory skills are not used. A significant number of pronunciation, lexical and grammatical mistakes have been made, making communication rather difficult
3	Communicative intent has been partially achieved; however, the logic and sequence of the statement are significantly violated, it seems incomplete, there without any conclusion. The language and speech tools used do not always correspond to the situation/topic/problem. The scope of the statement is below the professional language proficiency requirements. The speech is not fluent, with a significant number of pauses. Compensatory skills are not used. A number of pronunciation and lexical mistakes, as well as a significant number of grammatical ones, have been made, making communication difficult. The dialogical statement mostly does not correspond to the proposed communicative situation/ topic/ problem. The student is characterized by a slow reaction and has significant difficulties in maintaining a conversation. Compensatory skills are not used
4	Communicative intent has been achieved relatively fully. The statement is constructed logically and coherently. The speaker expresses his attitude to the topic/problem under discussion. The language and speech tools used correspond to the situation/topic/problem and vary within the studied material. The volume of the statement meets the professional language proficiency requirements. The speech is fluent. Compensatory skills are used, if necessary. A few pronunciation and grammatical mistakes were made without interfering with communication. The dialogical statement corresponds to the proposed situation / topic / problem, and is characterized by a quick reaction. The student is able to initiate and maintain a conversation. Speech cliches are used
5	The communicative intent has been fully achieved. The statement is constructed logically, coherently. The author expresses their attitude to the topic/problem under discussion. The language and speech tools used correspond to the situation/topic/problem and vary within the studied material. The volume of the statement meets the professional language proficiency requirements. The speech is fluent. A single mistake in pronunciation was made without interfering with communication. The dialogical statement corresponds to the proposed situation / topic / problem, and is characterized by a quick reaction

Source: compiled by the authors.

Internet and make up a collaborative report. Discuss it with the other students. You can consult with the digital glossary

– watch the video “Building Future Jet Engine” and make up 5 questions for 5 of your groupmates. Agree or disagree with their opinion;

– read the passage and comment on the difference between two types of radio waves modulation – AM (amplified modulation) and FM (frequency modulation) using the digital glossary.

The given exercises provide the development of foreign language speaking skills, im-

plemented in order to describe and perform professional tasks. The implementation of foreign language speaking exercises is also complemented by a digital glossary of the aviation personnel professional vocabulary. This allows future aviation specialists to use the studied language units confidently in accordance with the type of utterance and the situation of professional communication. The formation of dialogue and monologue speech skills is carried out on the basis of exercises aimed at both premediated and spontaneous dialogue and monologue.

At the end of the experimental training, the final test was conducted in both control and ex-

periment groups, including the tasks similar to the ones applied to the initial test.

RESULTS AND DISCUSSION

During the initial test the main problems indicated among the EG students were expressing their own judgments about the information received and clarifying the interlocutor's attitude to it, the clarity and logic of argumentation of their own point of view when answering a question, as well as perception and reaction to the information voiced by the interlocutor. The same point is illustrated in Table 2. This provision has confirmed for us the relevance of the digital glossary implementation and further work in the EG within the framework of the CLIL methodology.

Nevertheless, at the final test the evaluation of speaking skills among the EG students showed a sufficient development of skills of spontaneous dialogue and monologue during the discussion and commenting on the statement, whereas for KG the tasks offered caused minor difficulties. Also, the obtained results allow to talk about improvements in indicators throughout the entire period of the pedagogical experiment (Table 3).

In order to develop further strategic training goals and objectives, as well as to plan and arrange the educational process based on CLIL methodology, a situational, SWOT analysis of the developed CLIL model is conducted, considering its advantages (Strengths), disadvantages (Weaknesses), potential (Opportunities) and risks (Threats) (Table 4).

Table 2
The results of the initial speaking tests in control (CG) and experimental (EG) groups

Level indicated/points	CG (<i>n</i> = 45 ppl. = 100%)	EG (<i>n</i> = 45 ppl. = 100%)
Minimum (0–20 p.), %	11.1	13.3
Average (21–35 p.), %	48.9	51.1
Maximum (36–50 p.), %	40.0	38.6

Source: calculated and compiled by the authors.

Table 3
The results of the final speaking tests in control (CG) and experimental (EG) groups

Level indicated/points	CG (<i>n</i> = 45 ppl. = 100%)	EG (<i>n</i> = 45 ppl. = 100%)
Minimum (0–20 p.), %	12.3	16.0
Average (21–35 p.), %	50.0	54.2
Maximum (36–50 p.), %	42.0	43.1

Source: calculated and compiled by the authors.

CONCLUSION

The purpose of the described study was to present the experiment training of the students of technical (aviation) university based on the CLIL model in which a digital aviation English glossary as one of its components. By means of pedagogical experiment, the effectiveness of the CLIL model, based on a combination of digital glossary and a system of exercises, and the rationality of its introduction to the aviation English course, has been proved.

Considering the higher education system, it should be noted that the introduction of digital technologies affects the modernization of research activities and the educational process as a whole. In the context of CLIL, digital technologies are implemented both for classroom and independent work of students for presenting professional and language content, required for an effective foreign language speaking skills formation and, consequently, professional knowledge development. The case of this study also proves that a technology, like MyEfe digital glossary, can assist students and teachers in maintaining stable feedback and learning/teaching at any time and under any conditions.

The prospects of this study are related to the possibility of developing CLIL training course based on digital technologies during the preparation of bachelors, undergraduates and aviation specialists receiving additional professional education. The developed studying materials, such as MyEfe digital glossary can also serve as

Table 4
SWOT-analysis on the “MyEfe” digital glossary + CLIL educational model implementation

Strengths	Weaknesses
<ul style="list-style-type: none"> – saving studying hours for teaching at technical universities; – training of future specialists capable of carrying out only professional and research tasks; – improving the educational and personal/professional motivation of students; – improving student academic performance through digital technologies used to support learning activities and student feedback; – the use of authentic language and text materials; – greater participation of the students in the educational process and its organization with the help of digital glossary 	<ul style="list-style-type: none"> – high requirements for the level of language proficiency and professional training of students and teaching staff; – high requirements for the level of formation of digital skills of students and teaching staff, the need for instruction on a proper use of some digital technologies; – quite a lot of time is spent in the process of preparing for classes and organizing them; – the need for constant professional retraining, search and research of new digital technologies and approaches to their use
Opportunities	Threats
<ul style="list-style-type: none"> – simultaneous achievement of two purposes: professional knowledge and language skills formation; – modeling of professional activity situations in the context of a foreign language environment (conducting discussions, research projects, etc.) 	<ul style="list-style-type: none"> – limited material and technical resources of the department or university; – lack of motivation for the use of digital technologies on the part of both students and teachers; – lack of a single manual that takes into account the specifics of the organization and implementation of the methodology of CLIL

Source: compiled by the authors.

a basis for creating an integrated professional language course, as well as for introducing new textbooks and foreign language training programs for technical universities.

Despite the numerous advantages, it is worth noting that the use of digital technologies,

as such, may be irrational, since their didactic potential is important not only to consider, but also to realize in full through its integration with the exercise system, which forms the methodological basis of the developed and implemented educational model.

References

1. Marsh D. et al. (2010). *Framework for CLIL Teacher Education: A Framework for the Professional Development of CLIL Teachers*. Graz, European Centre for Modern Languages Publ.
2. Coyle D., Hood Ph., Marsh D. (2010). *CLIL Content and Language Integrated Learning*. Cambridge, Cambridge University Press Publ., 173 p.
3. Darn S. (2006). *Content and Language Integrated Learning (CLIL): A European Overview*. Izmir, Izmir University of Economics Publ.
4. Dalton-Puffer C. (2011). Content-and-language integrated learning: From practice to principles? *Annual Review of Applied Linguistics*, vol. 31, pp. 182-204.
5. Mehisto P., Ting T. (2017). *CLIL Essentials for Secondary School Teachers*. Cambridge, Cambridge University Press Publ., 312 p.
6. Pavón Vázquez V. et al. (2018). Learning outcomes in CLIL programmes: A comparison of results between urban and rural environments. *Porta Linguarum*, no. 29, pp. 9-28. <http://dx.doi.org/10.30827/Digibug.54020>
7. Zaripova R.R., Salekhova L.L., Danilov A.V. (2017). Interactive web 2.0 tools in content and language integrated learning. *Vysshee obrazovanie v Rossii = Higher Education in Russia*, no. 1, pp. 78-87. (In Russ.) <https://elibrary.ru/xqxedp>

8. Grigor'eva K.S., Salekhova L.L. (2014). Implementation of the principles of object-language integrated learning through technology web 2.0 in a technical university. *Vestnik Rossiiskogo universiteta družby narodov. Seriya: Informatizatsiya obrazovaniya = RUDN Journal of Informatization in Education*, no. 2, pp. 11-19. (In Russ.) <https://elibrary.ru/scnmsl>
9. Khalyapina L.P., Yakhyaeva K.M. (2021). Content and stages of implementation of the methodological model of integrated learning for a foreign language and professional disciplines based on digital technologies. *Inostrannye yazyki v shkole = Foreign Languages at School*, no. 5, pp. 56-63. (In Russ.) <https://elibrary.ru/cnjuig>
10. Baranova T., Khalyapina L., Yakhyaeva C. (2019). Google products as a source of students' autonomy in content and language integrated learning. *12th International Conference on Developments in eSystems Engineering (DeSE)*. Kazan, Institute of Electrical and Electronics Engineers Inc. Publ., pp. 383-387. <https://doi.org/10.1109/DeSE.2019.00076>, <https://elibrary.ru/waffsn>
11. Herasymenko L. et al. (2021). Reticence is not a virtue in aviation: improving English speaking proficiency of future aviation specialists. *Revista Romaneasca Pentru Educatie Multidimensionala*, vol. 13, issue 2, pp. 498-515. <http://dx.doi.org/10.18662/rrem/13.2/433>
12. Paramasivam S. (2013). Materials development for speaking skills in Aviation English for Malaysian air traffic controllers: Theory and practice. *Journal of Teaching English for Specific and Academic Purposes*, vol. 1, no. 2, pp. 97-122.
13. Sismondo S. (2018). Science and technology studies. *Companion to Environmental Studies*. Routledge Publ., pp. 356-359. <http://dx.doi.org/10.4324/9781315640051-72>
14. Sylvia T., Rochmawati L., Novalina S.D. (2024). The efficacy of blended learning in Enhancing oral proficiency in aviation school: an in-depth investigation. *Journal of English Educators Society*, vol. 9, no. 1, pp. 80-96. <https://doi.org/10.21070/jees.v9i1.1806>
15. Khalyapina L., Yakhyaeva C. (2019). The development and implementation of m-glossary in the system of content and language integrated learning. *Communications in Computer and Information Science*, vol. 1038, pp. 493-505. https://doi.org/10.1007/978-3-030-37858-5_42, <https://elibrary.ru/zefwsv>
16. Fesenko O.P., Laukhina S.S. (2015). Electronic dictionaries as a product of modern lexicography. *Omskii nauchnyi vestnik = Omsk Scientific Bulletin*, no. 4 (141), pp. 46-48. (In Russ.) <https://elibrary.ru/uktxit>
17. Marus M.L. (2014). Comparative analysis of modern multilingual online dictionaries, evidence from Multitran and ABBYY Lingvo Online dictionaries. *Nauchno-metodicheskii ehlektronnyi zhurnal «Kontsept» = Scientific-methodological electronic journal "Koncept"*, no. S1, pp. 51-55. (In Russ.) <https://elibrary.ru/rvncdn>
18. Krylov E.G. (2018). About forming a specialist's professional foreign language lexicon in teaching/learning engineering. *Vestnik Permskogo natsional'nogo issledovatel'skogo politekhnicheskogo universiteta. Problemy yazykoznaniiya i pedagogiki = PNRPU Linguistics and Pedagogy Bulletin*, no. 1, pp. 157-166. (In Russ.) <https://doi.org/10.15593/2224-9389/2018.1.13>, <https://elibrary.ru/yvxjzo>
19. Yataeva E.V. (2016). Learner's electronic dictionary as a means of foreign language learning lexical competence development. *Vestnik Chelyabinskogo gosudarstvennogo pedagogicheskogo universiteta = Herald of Chelyabinsk State Pedagogical University*, no. 10, pp. 135-140. (In Russ.) <https://elibrary.ru/xtcfkf>
20. Krylov E.G. (2012). *Theory of Mechanics: Russian-English Thesaurus*. Izhevsk, Kalashnikov ISTU Publ., 63 p. (In Russ.) <https://elibrary.ru/tfkdf>
21. Zaripova R.R. (2014). Pedagogical experiment of implementing the Russian-English CLIL (content and language integrated learning) model in higher education. *Sovremennye problemy nauki i obrazovaniya*, no. 6, art. 771. (In Russ.) <https://elibrary.ru/tgqpw>

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