ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Абай атындағы Қазақ ұлттық педагогикалық университетінің

Х А Б А Р Ш Ы С Ы

ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК РЕСПУБЛИКИ КАЗАХСТАН
Казахский национальный педагогический университет имени Абая

THE BULLETIN

THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
Abai Kazakh National Pedagogical University

PUBLISHED SINCE 1944

3 (403)

MAY-JUNE 2023

ALMATY, NAS RK

«Қазақстан Республикасы Ұлттық ғылым академиясының Хабаршысы».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ (Алматы қ.).
Қазақстан Республикасының Ақпарат және коммуникациялар министрлігінің Ақпарат комитетінде 12.02.2018 ж. берілген
№ 16895-Ж мерзімдік басылым тіркеуіне қойылу туралы куәлік.
Тақырыптық бағыты: *әлеуметтік ғылымдар саласындағы зерттеулерге арналған.*
Мерзімділігі: жылына 6 рет.
Тиражы: 300 дана.
Редакцияның мекен-жайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., тел.: 272-13-19
http://www.bulletin-science.kz/index.php/en/

Типографияның мекен-жайы: «Аруна» ЖК, Алматы қ., Мұратбаев көш., 75.

«Вестник Национальной академии наук Республики Казахстан».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Собственник: РОО «Национальная академия наук Республики Казахстан» (г. Алматы). Свидетельство о постановке на учет периодического печатного издания в Комитете информации Министерства информации и коммуникаций и Республики Казахстан **№ 16895-Ж,** выданное 12.02.2018 г.
Тематическая направленность: *посвящен исследованиям в области социальных наук.*
Периодичность: 6 раз в год.
Тираж: 300 экземпляров.
Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, тел. 272-13-19
http://www.bulletin-science.kz/index.php/en/

Адрес типографии: ИП «Аруна», г. Алматы, ул. Муратбаева, 75.

Bulletin of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Owner: RPA «National Academy of Sciences of the Republic of Kazakhstan» (Almaty). The certificate of registration of
a periodical printed publication in the Committee of information of the Ministry of Information and Communications
of the Republic of Kazakhstan **No. 16895-Ж,** issued on 12.02.2018.
Thematic focus: *it is dedicated to research in the field of social sciences.*
Periodicity: 6 times a year.
Circulation: 300 copies.
Editorial address: 28, Shevchenko str., of. 220, Almaty, 050010, tel. 272-13-19
http://www.bulletin-science.kz/index.php/en/

Address of printing house: ST «Aruna», 75, Muratbayev str, Almaty.

BULLETIN OF NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
ISSN 1991-3494
Volume 3. Number 403 (2023), 172-186
https://doi.org/10.32014/2023.2518-1467.501

IRSTI 29.01.45

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PRINCIPLES AND CONTENT OF TEACHING PHYSICS IN ENGLISH FOR FUTURE PHYSICS TEACHERS

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Abstract. In the context of Industry 4.0, research has increased as a way for our country to take a prestigious place in the world community in the natural and engineering fields - to adapt future specialists with English to life in accordance with modern requirements, to develop their competitive abilities. Science does not stand still, and with it the modern education system is changing. Of course, it is not enough for a learner to just passively listen and remember information. Now it is important not only to be able to apply the knowledge gained, but also to independently create new solutions, critically rethink the available data and reveal previously unused opportunities for science and technology. To do this, it is necessary to have a deep knowledge of the English language. The main purpose of this study is to determine the principles and content of the development of training of future physics teachers in English. The article discusses the methods of CLIL (subject-language integrated learning) and presents the possibilities and content of the implementation of this methodology in the preparation of textbooks and digital resources for teaching physics in English. In the course of the study, along with the analysis of scientific literature,

textbooks and digital resources, a survey of students of educational programs in the field of physics and engineering, control work was carried out. In addition, 30 school physics teachers took part in the survey. The results of the study prove the need to create textbooks, notebooks developed in the nature of CLIL for students studying physics in the direction of Natural Science and engineering. In addition, the results of the study made it possible to develop the principles and content for the development of training of future physics teachers in English. The results obtained are used in the process of teaching physics in institutions of higher and secondary education, in advanced training courses.

Keywords: CLIL technology, training principles, future physics teachers, English, development

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БОЛАШАҚ ФИЗИКА МҰҒАЛІМДЕРІНЕ ФИЗИКАНЫ АҒЫЛШЫН ТІЛІНДЕ ОҚЫТУДЫҢ ҚАҒИДАЛАРЫ МЕН МАЗМҰНЫ

Аннотация. Индустрия 4.0 жағдайында еліміздің жаратылыстану және инженерлік салада әлемдік қауымдастықта беделді орын алу жолы ретінде - ағылшын тілін меңгерген болашақ мамандарды заман талабына сай өмірге бейімдеу, олардың бәсекелестік қабілеттерін дамыту бойынша зерттеулер арта түсті. Ғылым бір орында тұрмайды, онымен бірге қазіргі білім беру жүйесі де өзгеруде. Әрине, білімгер тек ақпаратты пассивті тыңдап, есте сақтап қана қоюы жеткіліксіз. Қазір алған білімдерін қолдана білу ғана емес, сонымен қатар жаңа шешімдерді өз бетінше құру, қолда бар деректерді сыни тұрғыдан қайта қарастыру және ғылым мен техниканың бұрын пайдаланылмаған мүмкіндіктерін ашу маңызды. Ол үшін ағылшын тілін терең меңгеру қажеттігі туындайды. Бұл зерттеудің негізгі мақсаты – болашақ физика мұғалімдерінің ағылшын тілінде даярлығын дамытудың қағидалары мен мазмұнын айқындау болып табылады. Мақалада CLIL (пәндік-тілдік кіріктірілген оқыту) әдістері қарастырылады және физиканы ағылшын тілінде оқыту бойынша оқулықтар мен цифрлық ресурстарды дайындау кезінде осы әдістемені енгізудің мүмкіндіктері мен мазмұны келтірілген. Зерттеу барысында ғылыми әдебиеттерді, оқулықтар мен цифрлық ресурстарды талдаумен қатар, физика және инженерия саласындағы білім беру бағдарламаларының студенттеріне сауалнама, бақылау жұмыстары жүргізілді. Сонымен қатар, сауалнамаға 30 мектеп физика мұғалімдері қатысты. Зерттеу нәтижелері жаратылыстану және инженерия бағытында физика пәні бойынша білім алатын студенттерге CLIL сипатында әзірленген оқулықтар, дәптерлер жасау қажеттілігі дәлелденген.

Сонымен қатар, зерттеу нәтижелері болашақ физика мұғалімдерінің ағылшын тіліндегі даярлығын дамытудың қағидалары мен мазмұнын жасауға мүмкіндік берді. Алынған нәтижелер жоғары және орта білім беру мекемелерінде физиканы оқыту үдерісінде, біліктілікті арттыру курстарында қолданылады.

Түйін сөздер: CLIL технологиясы, оқыту принциптері, болашақ физика мұғалімдері, ағылшын тілі, дамыту

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ПРИНЦИПЫ И СОДЕРЖАНИЕ ПРЕПОДАВАНИЯ ФИЗИКИ НА АНГЛИЙСКОМ ЯЗЫКЕ ДЛЯ БУДУЩИХ УЧИТЕЛЕЙ ФИЗИКИ

Аннотация. В условиях Индустрии 4.0 все больше исследований по адаптации будущих специалистов, владеющих английским языком, к современной жизни, развитию их конкурентных способностей — как пути нашей страны занять престижное место в мировом сообществе в естественнонаучной и инженерной сфере. Наука не стоит на месте, вместе с ней меняется и современная система образования. Конечно, недостаточно, чтобы обучающийся мог только пассивно слушать и запоминать информацию. Сейчас важно не только уметь применять полученные знания, но и самостоятельно создавать новые решения, критически переосмысливать имеющиеся данные и раскрывать ранее неиспользованные возможности науки и техники. Для этого необходимо глубокое владение английским языком. Основной целью данного исследования является определение принципов и содержания развития подготовки будущих учителей физики на английском языке. В статье рассматриваются методы CLIL (предметно-языковое интегрированное обучение) и приводятся возможности и содержание внедрения данной методики при подготовке учебников и цифровых ресурсов по преподаванию физики на английском языке. В ходе исследования, наряду с анализом научной литературы, учебников и цифровых ресурсов, были проведены анкетирование, контрольные работы студентов образовательных программ в области физики и инженерии. Кроме того, в опросе приняли участие 30 школьных учителей физики. Результаты исследования доказали необходимость создания учебников, тетрадей, разработанных по характеру CLIL для студентов, обучающихся по физике в естественнонаучном и инженерном направлениях. Кроме того, результаты исследования позволили разработать принципы и содержание развития подготовки будущих учителей физики по английскому языку. Полученные результаты используются в процессе обучения физике в учреждениях высшего и среднего образования, на курсах повышения квалификации.

Ключевые слова: технология CLIL, принципы обучения, будущие учителя физики, английский язык, развитие

Introduction

Our preliminary research shows the crisis in the technical and engineering workforce in our country. According to employers and industries, this problem is caused by low academic performance in physical and mathematical disciplines in education, low motivation for teaching steam disciplines and the fact that technical and engineering specialties are chosen less often than others. At the same time, a large demand (STEM employees) for specialists with a new type of engineering thinking and inventive potential, a set of competencies for the development and management of technologies, qualified specialists with knowledge of the English language with practical skills in working with complex technological objects was revealed.

These requests set the task not only to improve existing knowledge, but also to find new ways to prepare future specialists for solving specific problems of the world around them.

The method of integrated subject and language learning (CLIL) was proposed by the European Commission as part of the efforts to develop multilingual education in Europe for 2004–2006. This method was developed for the development of languages and subjects in other languages, which are one of the signs of competitiveness of school graduates in the era of globalization, which is constantly changing (The New Industrial Strategy for Europe, 2021).

The CLIL method was introduced by the scientist in the field of multilingual education Isabekova G.B., Duisenova N.T in the course of work on coordinating research on the state of language education (Isabekova G.B., et al., 2022).

As the most effective methods of mastering a foreign language, we can cite the works of such famous scientists as Bürgonyon J., Valke M., Soeteirt R., Shellens T. (2010), Mayer I. (2013), Jaharias P., Chatzeparaskevaido I., Karaoli F. (2017) and others, who introduced game technology into the educational process in connection with digital resources.

A. Ozbay, M. Kayaoglu (2015) studied the problems of teaching physics in English based on the REACT strategy. in its research, it examined the comparative performance of physics faculty students (physics faculty students participating in the English language preparatory program) in English grammar through the use of contextual teaching materials during classroom instruction. The main objective of the study is to evaluate teaching activities developed in accordance with the REACT (correlation, experience, application, cooperation and transmission) strategy within the context-oriented approach. The authors conducted the study with the participation of 25 physics students at an English Preparatory School in Turkey. After class, they conducted structured interviews for five participants. It was useful for students who participated in the study on the introduction of the REACT strategy in teaching English to physics students, which showed that correlation, experience, application, cooperation and, accordingly, education helped them apply and maintain the teachings they received.

The aim of the research of C. Pruekpramool & T. Sangpradit was to develop a continuing professional development program (CPD) using the curriculum of an integrated scientific approach in English and to increase the effectiveness of physics teachers so that they become experienced teachers and teach the subject in English. The participants were 22 English-speaking teachers (NNESTs) who taught physics at schools participating in the "world-class standard school" and "English for Integrated Studies (EIS)" projects under the Thai Ministry of Education. From a semi-structured interview, taking into account the opinions of the participants and the form of assessment, the results showed that the participants had a high level of satisfaction (Pruekpramool & Sangpradit, 2016).

In their research, Sh. Ramankulov, E. Dosymov, A.S. Mintasova and A.M. Pattaev (2019) stated that multilingualism, as a rule, is an integral part of modern society, since a specialist who can speak, read and write in several languages can withstand competition. These technologies include ICT and a case study method that helps students change their perception of how important a foreign language is in terms of knowledge, which the authors confirmed with statistics. In their research, the authors state some methodological aspects of the use of ICT and case studies in language integrated learning, as well as mechanisms for interdisciplinary coordination and cooperation between English Language teachers and physics teachers, which have contributed to the integration of ICT and case studies, and are also valuable for research in this field. The conducted theoretical and experimental studies clearly prove the need to introduce innovative methods in the form of case studies and ICT into the educational process to form the creativity of university students.

In addition, other research papers indicate that the use of English as a second language in higher education is a developing trend, especially for participants in engineering programs who are interested in participating in the international academic context. However, both the conditions for teaching the content of the engineering curriculum and the simultaneous use of English in a context that is not related to the native language lead to a deep understanding of risks and problems. With this in mind, the results of a literature review based on articles in academic databases regarding the application of two approaches were presented: integrated teaching of the English language as a teaching tool and content and language in engineering in higher education, with a particular interest in teaching physics due to its relevance in engineering education.

Therefore, there is a need to create an opportunity for future physics teachers to gain a place in the world competition in the field of Science and technology by identifying advanced technologies for mastering the English language, introducing them into the educational process.

Improving the training of future physics teachers in English, solving such problems as the lack of personnel for high-tech industries, low grades and knowledge of school graduates, the weakening of the natural and technical component of Secondary Education, the desire to master advanced technologies and low professional orientation — the main idea of our research work. To do this, we will update the principles and content of the development of training of future physics teachers in English.

Research methods

The methods used in the study were: Analysis of best practices in CLIL education, the importance of English in the development of scientific, technical and engineering fields, a survey of the degrees of knowledge of future specialists in English, acceptance of control tasks.

The analysis of scientific literature was carried out through articles that took place in peer-reviewed high-ranking journals. In the process of searching for articles by keywords and evaluating the content scopus.com, sciencedirect.com (Scopus, ScienceDirect) work with websites has been done. An analysis of the annotations of individual articles on the above keywords was carried out.

213 students studying physics at the Faculties of Science and Engineering took part in the survey and control work. In addition, 30 physics teachers from schools in the Turkestan region took part (table-1).

Table 1-the content of the survey questions.

Sequence of questions	Indicators (you need to select one)
1	2
Choose the one you need the most for your profession from the listed below (7-absolutely necessary; 1-absolutely not necessary).	7 6 5 4 3 2 1 English language __ Information technology __ Internet technology __ Mathematics __ General physics __ Economic theory __ Creative technology __ Pedagogy __ Training methodology __
How much do you consider it necessary to master English in your profession for the development of Science and technology in our country. (Score on a 7-point basis: 7-absolutely necessary,.....,1-absolutely no need)	7 6 5 4 3 2 1
Evaluate the advantages of teaching science subjects, including physics in English, with a 7-Point System: 7-Very High,....., 1-very low.	7 6 5 4 3 2 1
Assess the shortcomings of teaching natural sciences, including physics in English, with a 7-Point System: 7-Very High,....., 1-very low.	7 6 5 4 3 2 1
Evaluate the activities that you consider necessary to improve the effectiveness of teaching Physics in English.	7 6 5 4 3 2 1 Advanced training courses __ New ICT tools __ New methodological manuals and teaching aids New methods and methods of mastering the English language, preserving national values __ New forms of learning __

Evaluate the level of activity in teaching Physics in English.	7 6 5 4 3 2 1 The use of physical terms in units of measurement __ Solving problems in English __ Reading formulas __ Tell the laws __ Performing laboratory work __ Read and translate text __ Using multimedia animations __ Voluntary use of ICT elements __ Ability to analyze video presentations __
Use as the main methods for the formation of subject-language competence of students....	7 6 5 4 3 2 1 CLIL technology __ Gaming technology __ Interactive learning methods __ _____ _____
Do you believe that the use of ICT in the English interpretation of physical phenomena and laws in the educational process arouses interest, forms mental acuity, develops creativity? (Score on a 7-Point System: 7-I believe that you have a high rating,.....,1-absolutely disagree)	7 6 5 4 3 2 1

An indicator with an interval up to "1–3" indicates a low level for students, an indicator with an interval of "4-5" indicates an average level for students and an indicator with an interval of "6-7" indicates a high level for students.

At the same time, the control work was aimed at determining the level of students ' knowledge of English in the field of physics. The control work consists of a total of 5 tasks. The 1st task was evaluated on a 10-point system to determine the name, unit of measurement and designation of physical terms. The 2nd task was the definition of physical terms (20 points); the 3rd task was the solution of graphic problems (10 points); the 4th task was the test work (40 points) and the 5th task was related to writing and reading formulas (20 points) (table-2).

Table 2 - Evaluation criterion

№	Criteria	Descriptors	Score
1	High	can write physical knowledge in English.	70–100
		by speaking correctly, clearly, clearly, clearly, clearly, he is able to express thoughts in his own words.	
		the student learns physical laws and phenomena in English, fully understands and performs the tasks set in English.	
2	Average	the student can verbally state his knowledge of physics, but cannot write in writing.	50–69
3	Low	the student writes down his knowledge of physics in a small amount.	0–49
		by speaking, the game could not say in his own words at all	

As a result of the application of methods in accordance with the objectives of the study, the importance and methodological foundations of the use of the CLIL

educational approach as a means of mastering the English language are determined, the scientific literature published in peer-reviewed high-rating journals is studied, the best practices of the world are studied, control work is carried out on the basis of quantitative and qualitative methods.

Results and discussion

The scientific works that served as the basis for our research in the dissertation of I.U. Bekbulatova "formation of the communicative potential of future computer science teachers in teaching English subjects" considered the problem of integrated teaching of computer science in English, B.T. Kerimbayeva in her works emphasized the importance of training future specialists in the field of technology in English, A.E. Kubeeva proposed the prerequisites for integrated teaching of disciplines in the conditions of higher education institutions. From these studies, it follows that for any teacher, knowledge of their subject in a foreign language is as important as the skills and abilities to convey this knowledge to students. That is, if a future physics teacher, on the example of teaching in English, in addition to the above-mentioned subject knowledge and skills, has a deep knowledge of modern methods of transmitting this knowledge to students, general knowledge of innovative technologies, features of their application, then this teacher will be a great teacher, a master of his profession.

Language for special purposes, or language for Specific Purposes (LSP), is mainly used in relation to two areas of Applied Linguistics: the field of education and education system and the field that deals with the study of language variations in a special subject system. LSP can be used in any language required by learners as a means of fulfilling special purposes, and can also be used in English or in the field of English for Specific Purposes (ESP). LSP can be applied in the field of Applied Linguistics, which works on the diversity of languages used by students of a particular discipline, with a special emphasis on its genres, stylistic features and technical vocabulary.

At the Department of "physics" of the Kazakh-Turkish International University named after Khoja Ahmed Yasawi, joint work with foreign scientists of the Sakarya University of the Republic of Turkey continues in this direction of research. At the departments in this direction of research, 2 doctoral students and 4 undergraduates successfully defended their dissertations and put into practice the results of the research.

Two young scientists E. Dosymov and B. Kurbanbekov, who received a PhD degree in 2021, under the guidance of the project manager, conducted a study on the topics "development of the subject competence of future physics teachers on the basis of teaching mechanics in English "and" improving the practical training of future physics teachers on the basis of the school experiment technique course" (Gulnara et al., 2020). As a result of the research, a mobile application "Physics Handbook" was launched, elements of robotics were created on the basis of 3D printing, equipment for STEM classrooms was developed and introduced into the educational process. In addition, digital resources, teaching aids were published that allow you to learn in Kazakh and English at the same time, and many of the failed physical equipment was restarted using a 3D printer.

Learning English, students rely on simple and affordable engineering solutions, use modern materials and equipment, independently create product prototypes. To create the final product, the learner can use parts from existing equipment or make a model out of plastic and cardboard. In addition, in any case, he will have experience in combining different materials, learn to take into account the properties of objects and understand that the structural components of the model should be connected as much as possible. Therefore, the importance and needs of our research results can be demonstrated on the 3 basis below (Figure - 1).

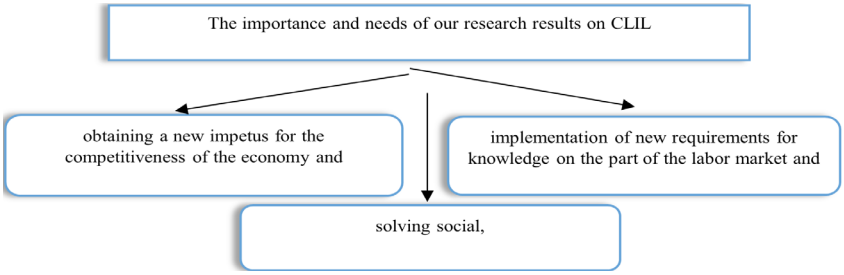

Fig. 1. Definitions characterizing the need to develop students ' creativity in teaching physics.

Before defining the principles of teaching a foreign language, we revealed the essence of the concept of "principle". A principle is an initiative, or something that underlies everything that exists, unites a set of thoughts and facts in reality, as well as a leading rule (Ramankulov et al., 2020). The principles of teaching physics are different: some principles depend on the entire educational process, while others determine only the teaching of a certain type of speech activity. At the same time, others are relevant only for a certain area of teaching a foreign language.

We understood the special place that CLIL technology occupies in teaching physics in English. Therefore, in the process of teaching students in English, the following principles should be observed in the development of the process of preparing a student in English:

 The principle of expediency – in the process of teaching physics in English, there should be no damage to the student's discipline readiness;

 The principle of sequence – in the process of teaching physics in English, it is necessary to predict the development of each component of the student's training in accordance with its composition;

 The principle of continuity – subject-language training of a student in the process of teaching physics in English should be carried out throughout the entire period of training;

 The principle of integrative-in the process of teaching physics in English, it is necessary to conduct an integrated distribution of the student's integrative connections, allowing students to see the relationship of basic core competencies;

 The principle of awareness and activity – presupposes a purposeful and active inclusion of the student, as well as a conscious understanding that these actions are necessary for them.

We have identified didactic principles for the effective implementation of the process of teaching physics in English for future teachers (Figure - 2).

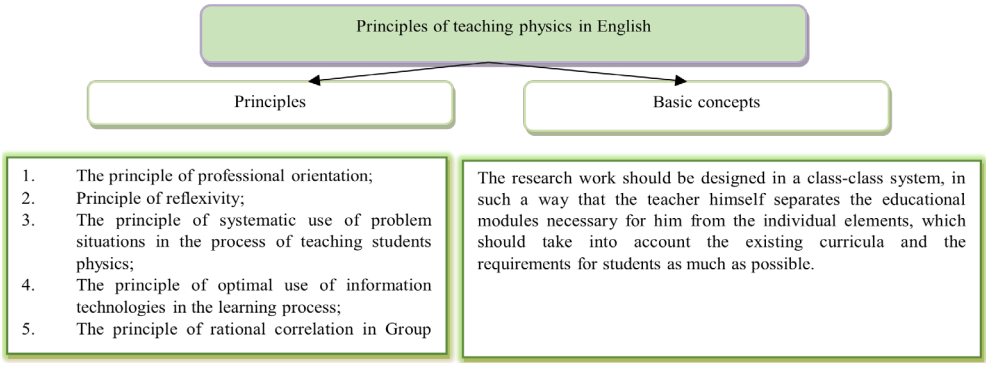

Fig. 2. Principles of teaching physics in English.

The principle of systematic use of problem situations in the process of teaching students physics is a problem-specific reflection of didactic principles. This principle involves the deliberate creation of a problematic situation under the guidance of a teacher, and students consider active activities to solve it. The principle of optimal use of information technologies in the learning process is implemented as the use of favorable information technologies. The implementation of this principle involves the creation of experimental research activities with new teaching methods using information technologies (Skakov et al., 2020). In Group and individual learning, the principle of rational correlation is implemented through the use of individual and collective forms of learning as balanced. In this principle, the learner is formed as an individual, on the one hand, ensuring his communication and interaction with other people, on the other-his desire for individualization. In conducting the reflection process, the student gets the opportunity to feel the value of the activities carried out, which contributes to the formation of a value-motivational component of experimental research activities (figure – 3, 4).

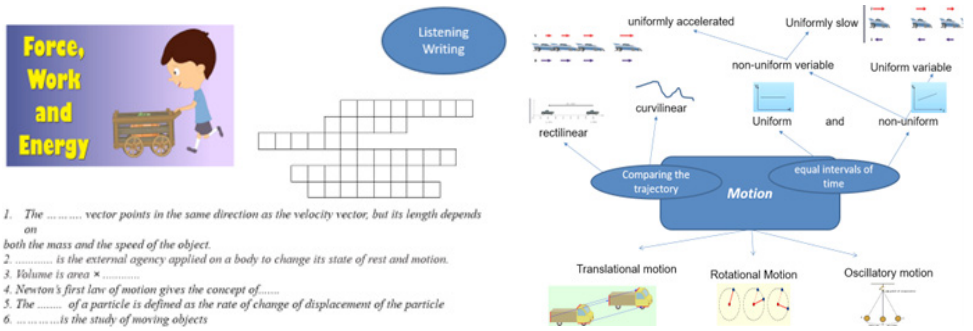

Fig. 3. Tasks on language skills.

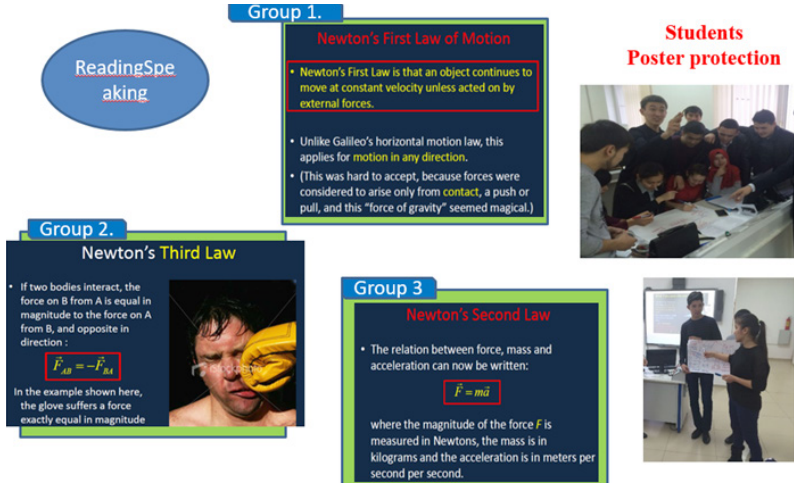

Fig. 4. Course of classes according to the principle of Group Training.

As can be seen in Figure 4, theoretical condensed material related to the topic(group) is distributed to 3 groups separately in A4 volume. The group leaders of each group come out and protect the poster by creating a reference diagram and an associogram on A3 paper.

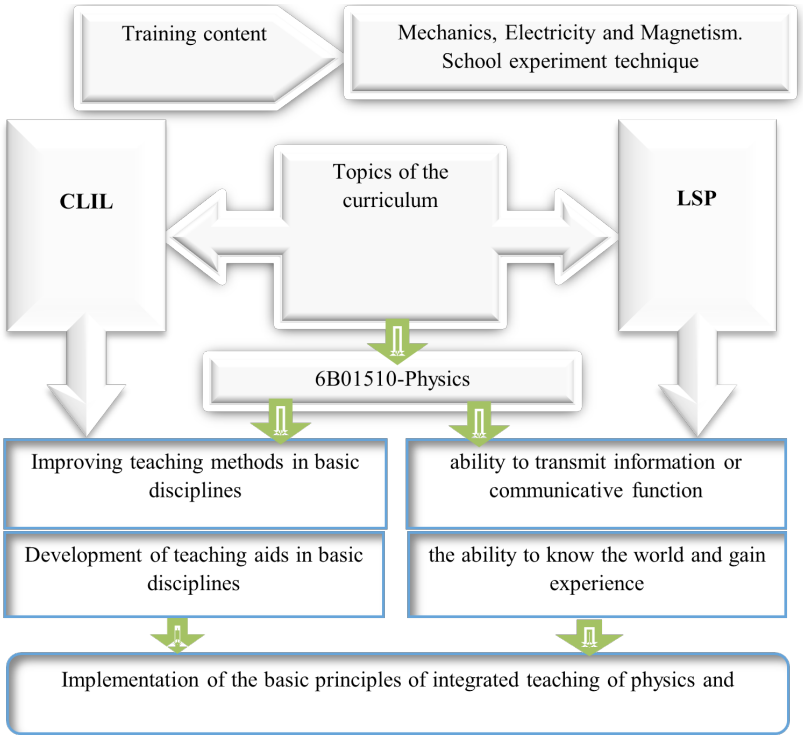

Fig. 5. Model of the mechanism for updating the content of teaching physics in English.

Bachelor of education in the specialty 6B01510 - "physics" must know the Constitution of the Republic of Kazakhstan, the law of the Republic of Kazakhstan" on education"," on the rights of children in the Republic of Kazakhstan" and other regulatory legal acts related to education, the basics of pedagogy and psychology. As a physicist-teacher in educational institutions, it is necessary to organize the pedagogical process and physical experiments, develop plans for educational activities (figure-5), participate in the preparation of scientific projects, develop working curricula, formulate and carefully solve problems in the field of physics education, use information technologies within the framework of pedagogical activity, learn English to the requirements of the time and successfully carry out research activities.

The impetus for updating the principles and content of training was the results of the above survey and control work. The results of the survey and control work will be presented below (table-2; figure-6).

To the question: "choose what you need most in your profession from the ones listed below," 78 % of the surveyed students believe that English is necessary in their future activities. The need to teach science subjects, including physics in English, is assessed as high by 75 % of the survey participants, while only 7 % consider it not necessary at all.

When asked if you could write down some of the benefits of teaching physics in English, the survey participants left the following answers:

- Contributes to the development of Science and technology;
- There is a lot of information in English, which helps us to gain in-depth knowledge;
- The opportunity to study world scientific projects will increase;
- Free reading and understanding of textbooks on physics written in English;
- Many opportunities will open up in all developed countries, since they are in English, our windows will be equal to them, the chances of getting a lot of information will increase;
- Develops applied orientation of physics;
- Teaching physics in English allows you to develop students ' vocabulary.It also creates conditions for the development of cognitive and creative flexibility abilities in the student.

As a physics teacher who is fluent in English, I understand that there are a lot of English materials on physics in preparation for classes. It's the same during class. There are enough high-quality books on pedagogy in English. That is, if you know English, you will be able to teach your subject at a high level as a specialist.

Table 2 - Assessment of the required level of activity in teaching physics in English.

Levels	Assessment of the required level of activity in teaching physics in English			
	Be able to use physical terms	Problem solving in English	Performing laboratory work	Reading formulas, pronouncing definitions.
Low	-	10	10	2
Average	2	25	20	30
High	98	65	70	68

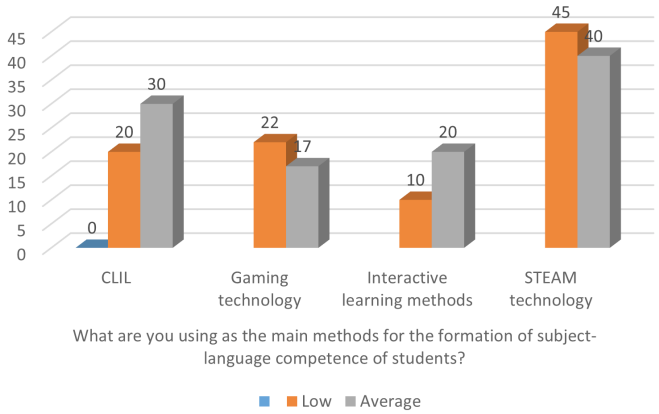

Fig. 6. Diagram of indicators for assessing the required level of activity in teaching physics in English.

The results of the survey showed that 98% of participants consider it necessary to conduct "advanced training courses" as necessary measures to improve the effectiveness of teaching physics in English. In addition, 70 participants highly appreciate the use of "new information tools" and "STEAM educational resources".

On the questions "Do you think that the use of ICT in explaining physical phenomena and patterns in the educational process in English arouses interest, forms the ingenuity of thought, develops creativity?" the survey showed that 68 % of the participating students rate highly. Only 2% of students believe that it is not necessary at all.

As the answers of the school teachers participating in the survey show, it is noticeable that teaching physics in English is a complex process within the walls of the school. One of the questions to identify alternative ways to solve this problem is: "what are you using as the main methods for the formation of subject-language competence of students?". We will list the results of the answer to this question below (figure - 7).

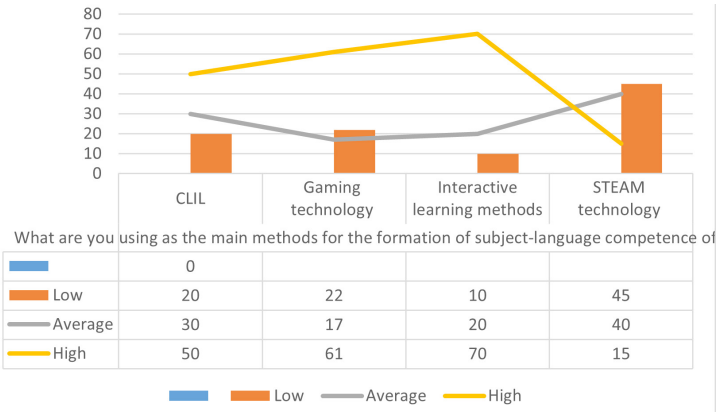

Fig.7. Indicators of school teachers' responses to the questionnaire question.

The results of the control work obtained in order to be able to apply physical knowledge in the implementation of tasks in English, to solve tasks in English, to determine the level of knowledge of the English language of students, reveal the relevance of our research topic. This is because 80% of students did not solve the tasks correctly. Only 8% of Studen completed the tasks for a very good grade. Since this is a pre-obtained control work, we publish its full results, including the results of the training experiment.

As a result of the experimental work, there is no doubt that the proposed teaching principles affect the acquisition by students of the skills of self-search and comparison, clarifying the knowledge gained in English in physics, the transition to abstract thinking, the ability to summarize, study thoughts, control. The results of the control to determine the indicators of the development of subject and language competence of students are evaluated according to the content and activity components, and we are confident that at the beginning of the educational process, the number of students who developed these indicators of subject and language competence increased.

Conclusion

One of the most pressing problems is the development of subject - language skills of students in teaching individual subjects of physics in English. The CLIL education sector makes an important contribution to the development of the competitiveness of future physics teachers at the global level. The didactic principles of mastering professional English for future physics teachers when teaching the discipline "mechanics", "electricity and magnetism", "school experiment techniques" at the University are the structure that ensures the improvement of the methodological system of teaching and the content of teaching. In addition, the introduction of additional courses for high school students is considered a source of development in the field of Science and technology in the future.

So, according to our research, it was shown that the organization of the process of teaching physics in English creates the following advantages for students:

- the transition to multi-subject communication through teaching physics in English allows students to transfer the way of activity from one goal to more goals;
- future physics teachers develop thinking activities from a large amount of problem situations in the process of integrated study of subjects;
- integrated subject-language learning allowed future physics teachers to control the process of performing all actions, from the goal to the result, and increased the amount of information in the educational process through the implementation of the metapposition position;
- integrated subject-language training contributes to the development of creativity, creative thinking of future physics teachers, the ability to apply knowledge in any field of physics.

Based on these, we propose to use the results of the study in the process of professional training of future teachers in higher educational institutions, improving their professional qualifications, distance learning and institutes that improve the professional qualifications of teachers.

«This research has been/was/is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP14870844)».

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www: nauka-nanrk.kz
ISSN 2518–1467 (Online),
ISSN 1991–3494 (Print)
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Заместитель директор отдела издания научных журналов НАН РК *Р. Жәлиқызы*
Редакторы: *М.С. Ахметова, Д.С. Аленов*
Верстка на компьютере *Г.Д. Жадырановой*

Подписано в печать 30.06.2023.
Формат 60x881/8. Бумага офсетная. Печать - ризограф.
40,0 п.л. Тираж 300. Заказ 3.

Национальная академия наук РК
050010, Алматы, ул. Шевченко, 28, т. 272-13-19