

Research Full Article

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DOI: <http://doi.org/10.15350/2409-7616.2022.3.08>**ON THE QUESTION OF BLENDED LEARNING IN A MODERN
TECHNICAL UNIVERSITY**

Yu.V. Koroleva, N.N. Avakimyan, E.N. Datsenko, I.O. Orlova, T.A. Chermit

Yulia V. Koroleva,

Senior Lecturer of the Department of Heat Power
and Heat Engineering, Kuban State Technological
University, Krasnodar, Russian Federation.

ORCID iD: 0000-0002-2838-1365

olga-lihacheva@rambler.ru**Natalya N. Avakimyan,**

Candidate of Physical and Mathematical Sciences,
Associate Professor, Department of General
Mathematics, Kuban State Technological
University, Krasnodar, Russian Federation.

ORCID iD: 0000-0002-1859-3276

olga-lihacheva@rambler.ru**Elena N. Datsenko,**

Candidate of Technical Sciences, Associate Professor,
Department of oil and gas business named after prof.

G.T. Vartumyan, Kuban State Technological

University, Krasnodar, Russian Federation.

ORCID iD: 0000-0002-4833-7687

olga-lihacheva@rambler.ru**Inna O. Orlova,**

Candidate of technical sciences, Associate Professor,
Department of oil and gas business named after

prof. G.T. Vartumyan, Kuban State Technological

University, Krasnodar, Russian Federation.

ORCID iD: 0000-0001-8026-7140

olga-lihacheva@rambler.ru**Timur A. Chermit,**

Student, Kuban State Technological

University, Krasnodar, Russian Federation.

ORCID iD: 0000-0002-9362-4028

olga-lihacheva@rambler.ru

Abstract. *This article discusses the possibility of using blended learning in the context of a modern technical university. The concept of blended learning in a technical university is defined,*

the most popular and effective models of blended learning in the modern realities of an engineering university are indicated, attention is focused on working with virtual simulators and laboratories, as well as high-tech industries. There is an effective dosing of traditional and distance forms, the need for their reasonable combination to achieve a higher learning outcome is argued. The positive and negative characteristics of blended learning are indicated, some recommendations are given for the modernization of technical education through the use of blended learning - the introduction of distant laboratories in special cases, the emphasis on the importance of independent work and its coordination by the teacher.

The subject of this study is blended learning in a modern technical university.

The object of the work is possible effective models of blended learning in the context of a technical high school, as well as virtual laboratories that contribute to the formation and development of competencies in a particular engineering field.

The relevance of the article lies in the need to improve technical higher education, its modernization and quality improvement. This article provides some recommendations for introducing a specific type of learning - blended within the technical school, namely, the use of efficient models of a flipped classroom, station rotation, laboratory rotation, a flexible model, an individual rotation model, and a virtual model itself.

The novelty of the work lies in the development of technologies for the introduction of mandatory virtual simulators, allowing in the practical field to master the future profession in the absence of high-tech equipment or a specialized laboratory at the university. It is this component that will represent the remote form in combination with real communication in the context of a technical high school, and will allow students to get better acquainted with technological innovations and developments, even in a virtual, remote format.

The work is recommended to methodologists, teachers-practitioners, future engineers, students, graduate students and undergraduates, as well as a wide range of people involved in methodology and pedagogical research.

Keywords: *blended learning, technical university, model, station rotation, flipped class, laboratory rotation, distance learning, result, efficiency.*

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Научная статья

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К ВОПРОСУ О СМЕШАННОМ ОБУЧЕНИИ В СОВРЕМЕННОМ ТЕХНИЧЕСКОМ ВУЗЕ

Ю.В. Королева, Н.Н. Авакимян, Е.Н. Даценко, И.О. Орлова, Т.А. Чермит

Королева Юлия Викторовна,
старший преподаватель кафедры теплоэнергетики
и теплотехники, Кубанский государственный

технологический университет, Краснодар, Россия.
РИНЦ SPIN – код: 6364-2629 / ORCID iD: 0000-0002-2838-1365
olga-lihacheva@rambler.ru

Авакимян Наталья Николаевна,
кандидат физико-математических наук, доцент,
кафедра общей математики, Кубанский государственный
технологический университет, Краснодар, Россия.
РИНЦ SPIN – код: 7020-2847 / ORCID iD: 0000-0002-1859-3276
olga-lihacheva@rambler.ru

Даценко Елена Николаевна,
кандидат технических наук, доцент, кафедра
нефтегазового дела имени проф. Г.Т. Вартумяна,
Кубанский государственный технологический
университет, Краснодар, Россия.
РИНЦ SPIN – код: 8167-4099 / ORCID iD: 0000-0002-4833-7687
olga-lihacheva@rambler.ru

Орлова Инна Олеговна,
кандидат технических наук, доцент,
кафедра нефтегазового дела имени проф.
Г.Т. Вартумяна, Кубанский государственный
технологический университет, Краснодар, Россия.
РИНЦ SPIN – код: 8819-8993 / ORCID iD: 0000-0001-8026-7140
olga-lihacheva@rambler.ru

Чермит Тимур Адамович,
студент, Кубанский государственный
технологический университет, Краснодар, Россия.
ORCID iD: 0000-0002-9362-4028
olga-lihacheva@rambler.ru

Аннотация. В данной статье рассматривается возможность использования смешанного обучения в контексте современного технического вуза. Определяется понятие смешанного обучения в техническом вузе, обозначаются наиболее востребованные и действенные модели смешанного обучения в современных реалиях инженерного университета, акцентируется внимание на работу с виртуальными тренажерами и лабораториями, а также высокотехнологичными производствами. Происходит эффективное дозирование традиционной и дистанционной форм, аргументируется необходимость их разумного сочетания для достижения более высокого результата обучения. Указываются положительные и отрицательные характеристики смешанного обучения, даются некоторые рекомендации по модернизации технического образования посредством использования смешанного обучения – введение дистантных лабораторий в особых случаях, выделение значимости самостоятельной работы и ее координация преподавателем.

Предметом данного исследования является смешанное обучение в современном техническом вузе.

Объектом работы служат возможные действенные модели смешанного обучения в контексте технической высшей школы, а также виртуальные лаборатории,

способствующие формированию и развитию компетенций и компетентностей в той или иной инженерной сфере.

Актуальность статьи заключается в необходимости усовершенствования технического высшего образования, в его модернизации и улучшении качества. Данная статья предоставляет некоторые рекомендации по введению особого типа обучения – смешанного в рамках высшей технической школы, а именно, использование действенных моделей перевернутого класса, ротации станций, ротации лабораторий, гибкую модель, модель индивидуальной ротации и собственно виртуальную модель.

Новизна работы заключается в разработке технологий введения обязательных виртуальных тренажеров, позволяющих в практическом поле освоить будущую профессию при отсутствии высокотехнологичного оборудования или специализированной лаборатории в вузе. Именно этот компонент будет представлять дистанционную форму в комбинации с реальным общением в контексте технической высшей школы, и позволит студентам более качественно ознакомиться с технологическими новшествами и разработками, пусть даже в виртуальном, дистанционном формате.

Работа рекомендована методистам, преподавателям – практикам, будущим инженерам, студентам, аспирантам и магистрантам, а также широкому кругу лиц, занимающихся вопросами методики и педагогическими исследованиями.

Ключевые слова: *смешанное обучение, технический вуз, модель, ротация станций, перевернутый класс, ротация лабораторий, дистант, результат, эффективность.*

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In modern educational space, new methods and approaches are becoming increasingly important, which increase the efficiency of the educational process, contribute to the high quality of the competencies acquired by students, and make it possible to produce a highly qualified and sought-after specialist - a professional in his field. It should be noted that modernization has begun to acquire increasing relevance due to the epidemiological situation in the world and recent events in the political arena, which gradually leads to a change in the educational paradigm, including in technical higher education[1].

In connection with the pandemic, Russian education was transferred to a remote format, which showed not the best result. Students experienced certain difficulties with distance learning platforms, with Internet coverage, with the inability to quickly get answers to the questions posed, with the need for explanation and direct interpretation of lecture material, and many others. Teachers also expressed dissatisfaction with the work of university remote platforms, which were not designed for a huge number of users and often failed, due to poor quality. Teachers also expressed dissatisfaction with the work of university remote platforms, which were not designed for a huge number of users and often failed, with poor-quality training of students, with an increase in the volume of work, despite the lack of direct contact with students[2].

At the same time, distance learning also revealed a number of positive characteristics, including the development of creative abilities of students, improving the quality of their independent work, the rational distribution of time for independent work[3], freeing up time for additional training, creative and many other useful extracurricular activities - sections, clubs, circles and so on.

In this vein, the need arose for a reasonable combination of full-time and distance learning, including technical universities. Given the demand for engineering education, combining the positive characteristics of the two above-mentioned forms into blended learning may be the beginning of modernization in the context of training high-quality engineering personnel for Russian society.

So, let's consider some variations of blended learning that can be extrapolated to a technical university with a maximum improvement in the quality of acquired competencies.

Due to the above factors and taking into account modern realities, we propose to introduce e-learning together with conservative, yet giving preference to work in the classroom or class “face to face” with students, while not forgetting about independent work and project activities[4].

Blended learning is an approach that combines teacher-assisted learning, online learning with self-monitoring elements, and the integration of teacher-led and online learning experiences. It should be noted that in the context of training at a technical university, initially virtual work with simulators is important, and then, if there is a base, visits and work in real laboratories, plants and factories. The main provisions of blended learning are characterized by the following aspects.

Firstly, it is the emphasis on the student, and it is he who is the center of the educational process. This means that the teacher is focused on the quality of education, on the student's feedback, is always ready to help and prompt the student precisely in the context of complex technical disciplines that were previously unknown to the student. The teacher is responsible for his work and is always ready to conduct control testing to fully see the picture of his student's progress.

Secondly, the main task of such training is competencies, i.e. skills of practical application of knowledge in practice [5]. This means that the applied nature of the knowledge acquired by students, the requirement for their effective and timely use in the future profession is the basis for quality education. It is the constant types of practices, remote work with simulators, virtual acquaintances with nano-productions and laboratories of modern equipment, visits to real high-tech industries that are the primary task in building the academic process. It should be noted that educational plans and programs, as well as the content of training, should be built in such a way as to meet the needs of society, meet its needs and provide specialists who truly know their profession and are interested in it.

Thirdly, it is personal responsibility for the results of one's own activities and personalization, i.e. we focus on what is interesting to the specified audience, what problems the trainees face in the specified team, the search for special methods and technologies to fill the educational gaps of the specified trainees. In this vein, it is important to identify the problems of a particular student or group and work them out qualitatively, compose tasks in such a way that existing difficulties with topics are excluded, provide an individual explanation and online completion of tasks, taking into account the problems of each student or group. At the same time, we note that the effectiveness of blended learning is influenced by personalization practices, modeling goals and flexibility in approaches and methods, certain transformations in the assessment system, differentiated learning, the level of independence of students, the importance of learning communities, awareness of one's own effectiveness, various test bases and their constant use. and active and interactive learning.

Blended learning is characterized by certain models, the most popular and recommended are the flipped classroom model, station rotation, laboratory rotation, flexible model, individual rotation model, extended virtual model and many others.

The flipped classroom model provides for independent study of educational material on a specific topic through an online environment. Students not only get acquainted with the material, but also fix it on their own [6]. In the classroom, the acquired knowledge is updated in the form of a role-playing game, a seminar, a project, and so on. The trainees themselves can present the material, act in accordance with the plan as a teacher, play with the topic from all sides and points of view,

clarify incomprehensible moments and reveal complex cases of a particular topic. In the context of a technical university, it is important to prepare an online course with a set of lectures, seminars, laboratory assignments, as well as with a fund of assessment tools that allow you to identify the level of knowledge of a particular topic or section, and it is also important to consider the most difficult moments in the classroom in order to better their assimilation, development of features, for an effective academic process.

The second recommended blended learning model is the station rotation model. Also, this variation is called the model of changing working areas [7]. In this context, the group is divided into those who work online, in the classroom and with the project. In the course of the lesson, there is a movement through all learning zones, the final of which is the online zone. Initially, students work with a teacher, the material is explained conservatively, using presentations and IT technologies. Then they can use the project - receive tasks for the development of the topic, deepening, for specialized exercises, for the preparation of interactive tasks. The project gives them the opportunity to realize themselves, and also provides for an individual approach to tasks, a creative component. Then they can go directly to the online zone, where they can submit their homework, independently view the material that is mandatory to study, and possibly complete a series of tests, including definitions and basic concepts, key provisions[8]. This model is convenient, but it requires the teacher to have the skills to work in such a system, mobility, creative approach to work and individual treatment of each student. Thus, it is an inverse variation of the inverted class model. Initially, direct training in the classroom, then - independent deepening and development of already explained material, development of creativity. In terms of a technical university, this is an important detail, since there are narrowly focused subjects that require a conservative explanation, and consolidation can occur in the online environment.

The next type of blended learning is lab rotation. This form provides for several classes in the classroom in the frontal mode, and part - in a computer class, i.e. kind of a laboratory. In the classroom, the trainees are explained the basic material, and in depth or additionally they master it already in the laboratory[9]. This form is very similar to the rotation of stations, but there students move within the same classroom, and in the case of a laboratory, they are placed in another, special room for online learning. This type becomes effective with the constant work of students online. Also, at the same time, learning motivation and the quality of knowledge increase, a group of students is formed who can take part in various competitions due to the large amount of additional material that they learn using the online environment.

In this context, attention should be paid to virtual laboratories for a technical university. Note that students should have an idea about machines, instruments, devices that the university does not always have. The latest equipment is not available in all technical universities at the present time. As a result, virtual simulators will help to get acquainted in a practical way with new engineering equipment, modern discoveries and progressive developments and achievements of engineering thought in a particular field.

The flexible model provides for the distribution of students in the classroom into mini-groups, the so-called mini-offices. Everyone has their own tablet or laptop. They receive tasks or topics, expand and deepen them, then group according to interests, share the information received, and analyze and synthesize the material[10]. To work in such a model, students must develop the skills of self-realization and self-organization, they have a free schedule, a student to develop, motivate himself and his colleagues. Each student has his own high goal, to which he goes, and the educational institution should encourage this. The so-called culture of high expectations is being formed, which allows the student to fully realize his potential and develop as a person and a future professional.

The individual rotation model assumes that students can move around the stations according to an individual schedule or a schedule set by the teacher. The program of each trainee adapts to his

abilities and capabilities, as a result of which he develops motivation, an individual approach is widely used. This is a breakthrough model that is close to the flexible model. Note that the difference from the flexible model is that there is no individual schedule for students, they study according to the general one for the entire educational institution.

Finally, the extended virtual model is an alternative to the online school and allows students to do most of the work at home, outside the school, outside the university. Note that such a model can work just in a special situation. Students can study on their own by receiving lecture material online and sending finished assignments to the teacher. Or face-to-face consultations are possible. They discuss difficult cases of material to be mastered[11]. Then again, students work online - they find material in addition to that provided by the teacher, perform tests and assignments. It is also possible to transfer part of the courses completely to online learning, and some of the subjects are read in the classroom. Then again, students work online - they find material in addition to that provided by the teacher, perform tests and assignments. It is also possible to transfer part of the courses completely to online learning, and some of the subjects are read in the classroom.

It should be noted that before making a decision on the use of blended learning, one should carefully study the realities - the readiness of online courses, the developed competencies of teachers and students in such work and study, high-quality Internet – coverage and equipment of the educational institution with computers, specialized platforms and programs for 90- 100%.

We emphasize that digital education should be used wisely, in conjunction with a conservative, classroom academic process. The methodologically correct application of various mixed educational models will greatly contribute to improving the quality of modern education, developing students' independence and raising their general intellectual and cultural level.

References:

1. Likhacheva O.N., Meretukova S.K. Some recommendations for improving the educational process in the classroom in a foreign language in a non-linguistic university. *Polythematic network electronic scientific journal of the Kuban State Agrarian University*, 2017, no. 131, pp. 1279-1288. (In Russian). EDN: [ZRXXWMZ](#) DOI: [10.21515/1990-4665-131-106](#)
2. Likhacheva O.N., Bedenko D.E. On the issue of modeling an English class in a non-linguistic technical university. *Scientific Works of the Kuban State Technological University*, 2020, no. 2, pp.157-163. (In Russian). EDN: [MVLASM](#) URL: <https://www.elibrary.ru/item.asp?id=43021690>
3. Likhacheva O.N. *Aspects of the formation of foreign language communicative competence in English classes in a non-linguistic university*. Grozny, Chechen State Pedagogical University Publ., 2020. pp. 346-351. (In Russian). EDN: [BYHFLP](#) URL: <https://www.elibrary.ru/item.asp?id=44638737>
4. Likhacheva O.N., Bedenko D.E. Teaching a foreign language in modern conditions in the context of a technical university. *Scientific Works of the Kuban State Technological University*, 2020, no. 5, pp. 70-76. (In Russian). EDN: [VSKKBH](#) URL: <https://www.elibrary.ru/item.asp?id=43959135>
5. Savenok O.V., Arutyunyan A.S., Petrushin E.O. *Secondary Opening of Productive Layers*. Paris, Atlantis Press Publ., 2017. pp. 734-741. EDN: [ZUHVZL](#) URL: <https://www.elibrary.ru/item.asp?id=30631181>
6. Likhacheva O.N. Some recommendations for teaching reading to students of technical universities using a profile component in foreign language classes. *Bulatov readings*, 2017, vol. 5, pp. 216-218. (In Russian). EDN: [XUWACL](#) URL: <https://www.elibrary.ru/item.asp?id=35349738>
7. Likhacheva O.N., Bedenko D.E. *Optimization of the educational process in the field of a foreign language as a guarantee of successful promotion of the future engineer*. Krasnodar,

Kuban State Technological University Publ., 2019, pp. 64-69. (In Russian). EDN: [XAVSAV](#) URL: <https://www.elibrary.ru/item.asp?id=37431057>

8. Likhacheva O.N. On the issue of improving the educational process in a non-linguistic university on the example of a foreign language. *Scientific Works of the Kuban State Technological University*, 2016, no. 10, pp. 267-272. (In Russian). EDN: [WWKPVT](#) URL: <https://www.elibrary.ru/item.asp?id=27163021>

9. Golovko M.V., Tsuverkalova O.F. Factors of innovative development in the system of economic security of territories: a statistical approach. *Theory and practice of service: economics, social sphere, technology*, 2019, no. 1 (39), pp. 5-10. (In Russian). EDN: [HRSVWS](#) URL: <https://www.elibrary.ru/item.asp?id=38175868>

10. Petrov I.F. Need content of personality: relationship and interdependence. *Bulletin of the Kemerovo State University*, 2012, no. 2 (50), pp.167-175. (In Russian). EDN: [OYQVPJ](#) URL: <https://www.elibrary.ru/item.asp?id=17760250>

11. Petrova S.I. Actual problems of studying the social environment. *Vestnik IMSIT*, 2017, no. 1 (69), pp. 21-23. (In Russian). EDN: [YLFWRZ](#) URL: <https://elibrary.ru/item.asp?id=29028298>

12. Pak L.G. Socio-pedagogical analysis of the process of socialization of the digital generation of university students. *Innovations in education*, 2022, no. 6, pp. 100-110. (In Russian). EDN: [SEXTND](#) URL: <https://www.elibrary.ru/item.asp?id=48659677>

13. Mukhametshin R.R. Electronic, digital, distance, blended learning - terminological analysis. *Bibliotekovedenie*, 2022, vol. 71, no. 1, pp. 103-111. (In Russian). EDN: [CNJDHC](#) DOI: [10.25281/0869-608X-2022-71-1-103-111](https://doi.org/10.25281/0869-608X-2022-71-1-103-111)

14. Shirkalin M.A., Romashkina E.B., Serova E.N. Integration of traditional and distance learning: regional methodological workshop. *Secondary vocational education*, 2022, no. 2 (318), pp. 12-16. (In Russian). EDN: [VFORMT](#) URL: <https://www.elibrary.ru/item.asp?id=48288161>

15. Shishelova T.I., Fedchishin V.V., Prostakova L.V. Organization of blended learning at the Department of Physics of the Irkutsk National Research Technical University. Voice of students. *Modern problems of science and education*, 2022, no. 2, pp. 6. (In Russian). EDN: [PWMGAR](#) DOI: [10.17513/spno.31530](https://doi.org/10.17513/spno.31530)

Список источников:

1. Лихачева О.Н., Меретукова С.К. Некоторые рекомендации по совершенствованию учебного процесса на занятиях по иностранному языку в неязыковом вузе // Политематический сетевой электронный научный журнал Кубанского государственного аграрного университета. 2017. №131. С.1279-1288. EDN: [ZRXWMZ](#) DOI: [10.21515/1990-4665-131-106](https://doi.org/10.21515/1990-4665-131-106)

2. Лихачева О.Н., Беденко Д.Е. К вопросу о моделировании занятия по английскому языку в неязыковом техническом вузе // Электронный сетевой политематический журнал «Научные труды КубГТУ». 2020. №2. С.157-163. EDN: [MVLASM](#) URL: <https://www.elibrary.ru/item.asp?id=43021690>

3. Лихачева О.Н. Аспекты формирования иноязычной коммуникативной компетенции на занятиях по английскому языку в нелингвистическом вузе // В сборнике: ШАГ В НАУКУ. Сборник материалов III Международной научно-практической конференции с участием студентов. - Грозный: Чеченский государственный педагогический университет, 2020. - С.346-351. EDN: [BYHFLP](#) URL: <https://www.elibrary.ru/item.asp?id=44638737>

4. Лихачева О.Н., Беденко Д.Е. Обучение иностранному языку в современных условиях в контексте технического вуза // Электронный сетевой политематический журнал

«Научные труды КубГТУ». 2020. №5. С. 70-76. EDN: [VSKKBH](#) URL: <https://www.elibrary.ru/item.asp?id=43959135>

5. Savenok O.V., Arutyunyan A.S., Petrushin E.O., Likhacheva O.N., Kusov G.V. Secondary Opening of Productive Layers. В сборнике: Actual Issues of Mechanical Engineering (AIME 2017). - Paris: Atlantis Press, 2017. - С. 734-741. EDN: [ZUHVZL](#) URL: <https://www.elibrary.ru/item.asp?id=30631181>

6. Лихачева О.Н. Некоторые рекомендации по обучению чтению студентов технических вузов с использованием профильного компонента на занятиях по иностранному языку // Булатовские чтения. 2017. Т. 5. С. 216-218. EDN: [XUWACL](#) URL: <https://www.elibrary.ru/item.asp?id=35349738>

7. Лихачева О.Н., Беденко Д.Е. Оптимизация учебного процесса в сфере иностранного языка как залог успешного продвижения будущего инженера. В сборнике: Профнавигация молодежи. Сборник материалов II Международной научно-практической конференции. - Краснодар: Кубанский государственный технологический университет, 2019. С.64-69. EDN: [XAVSAV](#) URL: <https://www.elibrary.ru/item.asp?id=37431057>

8. Лихачева О.Н. К вопросу об улучшении образовательного процесса в неязыковом вузе на примере иностранного языка // Электронный сетевой политематический журнал «Научные труды КубГТУ». 2016. №10. С. 267 -272. EDN: [WWKPVT](#) URL: <https://www.elibrary.ru/item.asp?id=27163021>

9. Головкин М.В., Цуверкалова О.Ф. Факторы инновационного развития в системе экономической безопасности территорий: статистический подход // Теория и практика сервиса: экономика, социальная сфера, технологии. 2019. № 1 (39). С.5-10. EDN: [HRSVWS](#) URL: <https://www.elibrary.ru/item.asp?id=38175868>

10. Петров И.Ф. Потребностное содержание личности: взаимосвязь и взаимообусловленность // Вестник Кемеровского государственного университета. 2012, №2 (50). С.167-175. EDN: [OYQVPJ](#) URL: <https://www.elibrary.ru/item.asp?id=17760250>

11. Петрова С.И. Актуальные проблемы изучения социальной среды // Вестник ИМСИТ. 2017. №1 (69). С. 21-23. EDN: [YLFWRZ](#) URL: <https://elibrary.ru/item.asp?id=29028298>

12. Пак Л.Г. Социально-педагогический анализ процесса социализации цифрового поколения студентов вузов // Инновации в образовании. 2022. № 6. С. 100-110. EDN: [SEXTND](#) URL: <https://www.elibrary.ru/item.asp?id=48659677>

13. Мухаметшин Р.Р. Электронное, цифровое, дистанционное, смешанное обучение - терминологический анализ // Библиотекосведение. 2022. Т. 71, № 1. С. 103-111. EDN: [CNJDHC](#) DOI: [10.25281/0869-608X-2022-71-1-103-111](https://doi.org/10.25281/0869-608X-2022-71-1-103-111)

14. Ширкалин М.А., Ромашкина Э.Б., Серова Е.Н. Интеграция традиционного и дистанционного обучения: региональный методический семинар-практикум // Среднее профессиональное образование. 2022. № 2 (318). С. 12-16. EDN: [VFORMT](#) URL: <https://www.elibrary.ru/item.asp?id=48288161>

15. Шишелова Т.И., Федчишин В.В., Простакова Л.В. Организация смешанного обучения на кафедре физики Иркутского национального исследовательского технического университета. Голос студентов // Современные проблемы науки и образования. 2022. № 2. С. 6. EDN: [PWMGAR](#) DOI: [10.17513/spno.31530](https://doi.org/10.17513/spno.31530)

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