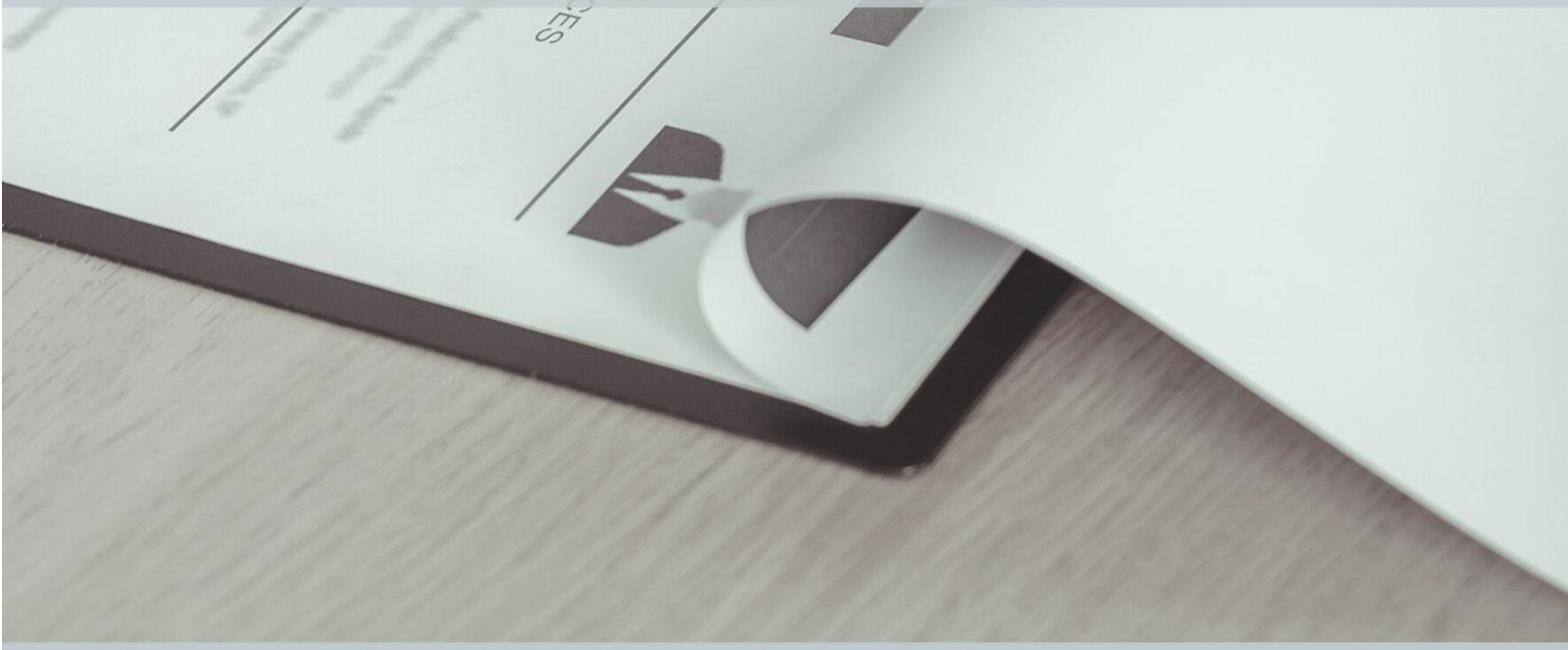
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN MANAGEMENT AND SOCIAL SCIENCES

Vol. 16 No. 2 (2022): February



ISSN 2278-6236

ASSOCIATE EDITORS

ARTICLES

INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT,

ENGINEERING AND SOCIAL SCIENCES

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

THE IMPORTANCE OF LIFE STORIES TO FOCUS STUDENTS'ATTENTION IN PRIMARY SCHOOL

N.Ismoilova

Teacher of Andijan state university.

N.Malikova

Student of Andijan state university.

Article history:

Received: 06 th February., 2022

Accepted: 07 th February., 2022

Published: 08 th February., 2022

Abstract: *This article deals with using a variety of life stories and multimedia tools to engage primary school students in their lessons.*

Key words: *Story, voice stories, listening skills, characters, sayings, attention.*

Without a model, you can't teach well, you can't read well.
(L.Kolumella.)

A. Avloni, who is one of our scholars, advised "If life itself cannot teach a person, any teacher cannot teach them[1] which requires that they embody the moral skills and competencies that embody their qualities. Most of the scholars understand that upbringing means only raising a child. In our opinion, this upbringing is needed not only by children but also by adults.

Today's young men and women, as well as older ones, are known for their good manners. There is a lot of evidence for this. Therefore, as is the foundation of all, the education given in the beginning is the basis of human life for the rest of one's life. If we compare the education, we receive in our lives with the education we receive in this building, we can compare the education we receive in this building to the education we receive in the beginning. Just as a building is not a building without bricks, how well, strong and beautiful a building is, of course, does not depend on its details.

The story is a small-scale art, in which a certain event in the life of a person is summarized and the most important aspects of life are summarized.[2]

The story is one of the genres in which the direct content is suitable for primary school students. Younger students are more interested in the behavior, appearance and events of the protagonists. the introduction is made by linking it to an explanation of its plot[3].

We know that today the need of our students to read stories is growing day by day. It should be noted that the role of storytelling is invaluable in increasing children's interest in books and later his interest in reading large-scale works will also increase. Even though 20-30% of our textbooks are storytelling, we can see that children's storytelling is growing.[4]

As we can see, through the above information, we can know the importance of the story genre and involve students in the stories and give them both spiritual and educational knowledge. we

[1]Abdulla Avloniy"Turkiy Guliston yoxud axloq" "Meros" -1993, 26- bet

[2]Sulton I.Adabiyot nazariyasi. – Toshkent:"O'qituvchi",1980. 245-bet.

[3] Karima Qosimova. Ona tili o'qitishmetodikasi.Toshkent."NOSIR" nashriyoti.2009.113-bet.

[4]Hojiniso Xotam qizi Yaxshiliqova, Iroda To'lqin qizi Ibragimova." Bolalar hikoyachiligining badiiy-estetik va ma'rifiy-tarbiyaviy o'ziga xosligi" nomli maqola.2021.5-bet.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

will need to select stories that are relevant to the topics and deliver them to the readers. Because children are interested in everything, it is often observed that their attention is quickly divided and scattered everywhere. This, of course, can only be due to their interest in science, level of learning, potential. we cannot, that is, they are likely to divert their attention, both out of curiosity and out of love for the science.

In a child preparing for school, attention can be considered to have a relatively long-term conditionally stable appearance. The characteristics of attention are directly reflected in listening to the story and composing it personally.[5] Apparently, it is not only the child who is affected, but also the external environment. Even if the child is watching the lesson closely, a close friend or peer may interfere. Even if it is under the control of the teacher, the child's attention will not be distracted. It is also caused by the extracurricular environment, which means that various interactions, such as other teachers or students entering the classroom, can also have an impact. According to the data, a person's attention span is limited to 20 minutes, and if this time is exceeded, their attention will be diverted, whether they want to or not. If we, the future teachers, know this information and standardize the knowledge they give to children as much as possible and give it with rest, it will certainly have a positive effect on the quality of the lesson, and students will be tired. You can say that time is a crossroads here, but if we plan each lesson and put it into a pattern from the beginning, the children will adapt to it and help us a lot. The skills are developed in the children, and then we can go to them and give them the results we expect. We have come to the conclusion from this article that often in reading lessons, outside of the curriculum, of course, in connection with the lesson, in order to attract the attention of children, to attract them all, fragments from short life stories or we want to release them to the children through multimedia as well, first reading them expressively at home and choosing the appropriate music for it. Children pay attention to more unusual things and get excited about them, so it will be more useful to deliver stories to them with the help of more video and audio broadcasts than we tell, of course, we must have prepared everything in advance. We need to think about everything and organize it so that it doesn't take too long. We can do this as a break, and we can do it in a non-traditional way, not only in reading lessons, but also in other lessons, depending on the topic.

Importantly, with the help of the above methods and suggestions, we can draw children's attention to ourselves, bring them into the context of the topic, expand the world of imagination and strengthen the topic covered, in addition, we teach students At the same time, we teach them to retell stories they have heard, to think, to develop their oral skills, to develop their vocabulary. Therefore, future teachers should know and study not only their subject, but also various other wise sayings and life stories.

In addition to the curriculum and textbooks, children learn a lot of information and draw the necessary conclusions. [A]nd of course, that's how I want to organize my future lessons. We also tried these methods in a short practice with 3rd graders.

When the children's attention was not focused, when there was no noise, we read a story in a loud, expressive, expressive way, and as a result, the class became calm, and all the children's attention was focused on me, and then on the story. So, we decided that what we really needed to do was learn how to do it right. For example, in the teaching and consolidation of numerals in native language classes, we can create oral stories from students involving numbers, so that children who have heard their stories can hear them, form their imagination, and develop their own independence.

[5]Ontogenez psixologiyasi. Ergash G'oziyev. "NOSHIR" Toshkent.2010. 137-bet.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

In order to get the students' attention before the beginning of the topic by telling the story in front of the math class, we can release audio stories to the audience.

References:

1. Ona tilio'qitishmetodikasi. Karima Qosimova. Toshkent "NOSIR" NASHR 2009
2. Ontogenezpsixologiyasi.ErgashG'oziyev. Toshkent "NOSIR" 2010
3. Bolalar hikoyachiligining badiiy-estetik va ma'rifiy-tarbiyaviy o'ziga xosligi mavzusida maqola.Hojiniso Xotam qizi Yaxshiliqo va Iroda To'lqin qizi Ibragimova.2021.
4. https://arxiv.uz;https://library.ziyonet.uz; https://ilmiy.bmti.uz
5. Tokhirov A.I. "WRITING CONTROL PROGRAMS FOR COMPUTER NUMERAL CONTROL MACHINES" // Universum: технические науки : электрон. научн. журн. 2021. 5(86).
URL: https://7universum.com/ru/tech/archive/item/11810
DOI - 10.32743/UniTech.2021.86.5.11810
6. Tokhirov A.I. "APPLICATION PROCEDURE CAD/CAM/CAE - SYSTEMS IN SCIENTIFIC RESEARCH" // Universum: технические науки : электрон. научн. журн. 2021. 6(87).
URL: https://7universum.com/ru/tech/archive/item/11836
DOI - 10.32743/UniTech.2021.87.6.11836
7. Tokhirov A.I. "USING THE GRAPHICAL EDITOR "КОМПАС 3D" in teaching computer engineering graphics" // Universum: технические науки : электрон. научн. журн. 2021. 7(88).
URL: https://7universum.com/ru/tech/archive/item/12076
DOI: 10.32743/UniTech.2021.78.8-3.12076
8. Tokhirov A.I., Marasulov I.R. "CONTROL MODELS AND INFORMATION SYSTEM OF COTTON STORAGE IN THE CLASTER SYSTEM" // Universum: технические науки : электрон. научн. журн. 2021. 11(92).
URL: https://7universum.com/ru/tech/archive/item/12486
9. Azamjon Ibrohim ugli Tokhirov, "TECHNOLOGICAL PROCESS DEVELOPMENT USING CAD-CAM PROGRAMS", "Science and Education" Scientific Journal, June 2021
URL: https://openscience.uz/index.php/sciedu/article/view/1561
10. Toxirov A'zamjon Ibrohim o'g'li, "METHODOLOGY OF TEACHING THREE-DIMEN MODELING USING THE PROGRAM "KOMPAS-3D"", EURASIAN JOURNAL OF ACADEMIC RESEARCH Innovative Academy Research Support Center,
URL: https://doi.org/10.5281/zenodo.4718298
11. *Marasulov Islombek Ravsjanbek o'g'li,Tohirov A'zamjon Ibrohim o'g'li, "THE IMPORTANCE OF AUTOMATION OF COTTON RECEIVING SYSTEM", EURASIAN JOURNAL OF ACADEMIC RESEARCH Innovative Academy Research Support Center,*
URL: https://doi.org/10.5281/zenodo.4898919
12. Toxirov A'zamjon Ibrohim o'g'li, "QUALITY IN MODERN MANUFACTURING ENTERPRISES THE ROLE OF ROBOTOTECHNICS AND AUTOMATED ELECTRICAL INSTRUMENTS IN PRODUCTION", EURASIAN JOURNAL OF ACADEMIC RESEARCH Innovative Academy Research Support Center,
URL: https://doi.org/10.5281/zenodo.4968770
13. Islombek Marasulov Ravshanbek Ogli, & Toxirov Azamjon Ibrohim Ogli. (2021). A ROLE OF MECHANICAL ENGINEERING IN MECHATRONICS.
JournalNX - A Multidisciplinary Peer Reviewed Journal, 824–828.
Retrieved from https://repo.journalnx.com/index.php/nx/article/view/1690

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT,

ENGINEERING AND SOCIAL SCIENCES

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

AMPEROMETRIC METHOD OF ANALYSIS AND ITS ADVANTAGES OVER OTHER METHODS

G.G. Sadullayeva

Bukhara State Medical Institute, Uzbekistan

Sh.B. Rakhmatov

Bukhara State Medical Institute, Uzbekistan

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *In addition to directly determining the concentration of the analyte for the experiment, it is also used to find the equivalence point in the titration process. An amperometric titration is used. The essence of amperometric titration is to measure the values of the diffusion current, which changes as a result of a change in the concentration of the analyte or titrant (reagent of known concentration). This method is called amperometric titration because the amplitude to be determined is the current measured in microamps (μA).*

Key words *- Amperometric titration, equivalence point, microampere, indicator.*

In the 21st century, in which we live in the era of globalization, one of the most important tasks of modern chemistry is the rapid development of industry, the synthesis of new organic and inorganic compounds and the study of their electrochemical, physicochemical and other properties. and biological activity has been and remains a hot topic for mankind.[1] Until recently, it was sufficient to detect and limit additives in a substance at a concentration of 10-2 -10-3% or 0.001%. For example, the sensitivity of chemical methods to the detection of certain additives in test substances may not be sufficient. In addition, although gravimetric determinations are time consuming, the use of titrimetric assays is also limited. Therefore, the current focus is on the development of new, more sensitive and faster methods of analysis. Amperometric titration is a titrimetric form of voltammetry that measures the saturated diffusion current, which changes during the titration, to find the end point of the titration. Previously, it was shown that there is a dependence Idqkc between the saturated diffusion current and concentration. In the first version of amperometric titration, proposed by Ya.[2;3] It takes a long time to find the end point of the vibration. Therefore, Meyer (1936) changed the order of amperometric titration. He used the diffusion current coefficient of the depolarizer concentration.

To carry out amperometric titration, a weighed portion of the solution of the tested polyarographically active substance is taken, to which the necessary reagents and background are added, and then connected to an amperometric (polarographic) device. A potential slightly higher than the half-wave potential is applied, and the substance in the cell is titrated using a titrant. In the amperometric titration process, the current strength is determined by the voltage corresponding to the current limit value after the gradual addition of the reagent.[4] Based on this information, an

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

amperometric titration curve is built in the coordinates of the current-titrant volume and the equivalence point is found graphically. Rotating platinum, graphite and other solid electrodes are used as indicator electrodes in amperometric titration. Solid electrodes are made from inert materials such as platinum, gold, tantalum.

Recently, electrodes made of non-porous types of graphite - pyrographite (glassy carbon, carbon-citrate) have become widespread. The second electrode may be any reference electrode with a larger surface area that is not current polarized. Silver chloride or calomel electrodes are often used. The reference electrode potential does not change during the titration.[5]

Amperometric titration curves. The form of amperometric titration curves varies depending on which component of the titration reaction - analyte, titrant or reaction product - is involved in the electrode reaction. Three types of chemical reactions can be used in the amperometric titration method: 1) sedimentation reactions, 2) oxidimetric reactions, and 3) complexometric reactions. It must meet the requirements for reactions of titrametric methods in terms of the speed and completeness of the reactions occurring during amperometric titration. CI-, Br-, J-, SO42-, CO32-, MnO4- and b. Most anions are titrated with a lead salt at a potential value of -0.4 V, at which the Pb2+ ions return to the dropping mercury electrode. Oxidation of the feracyanide ion [Fe(CN)6]-4 on a rotating platinum electrode at 0.7…1.0 V leads to Zn2+, Cu2+, Pb2+, Ca2+ and b. Used in amperometric titration of cations. Amperometric titration methods often use precipitation by the action of organic reagents.[6]

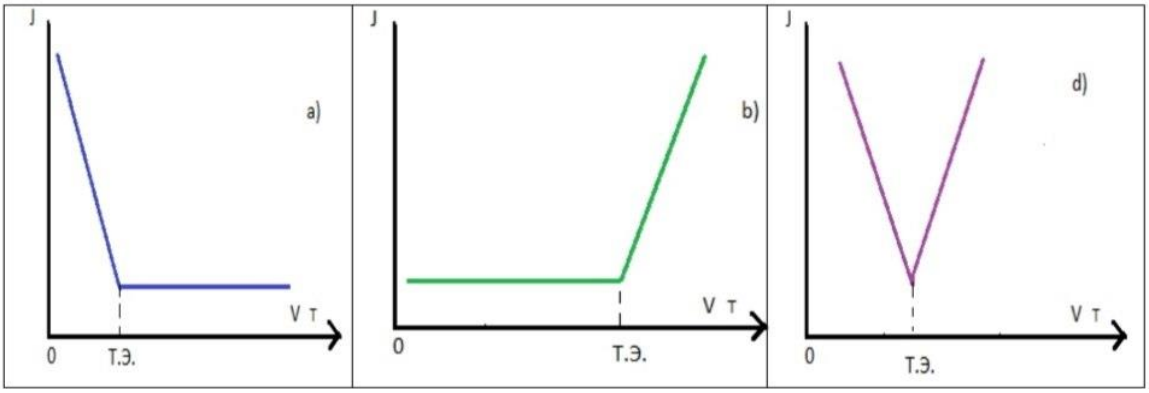


Figure 1. View of the ampermetric curve

Depending on the system of electrodes used, amperometric titration methods are divided into the following:

1) amperometric titration with one indicator (polarized) electrode;

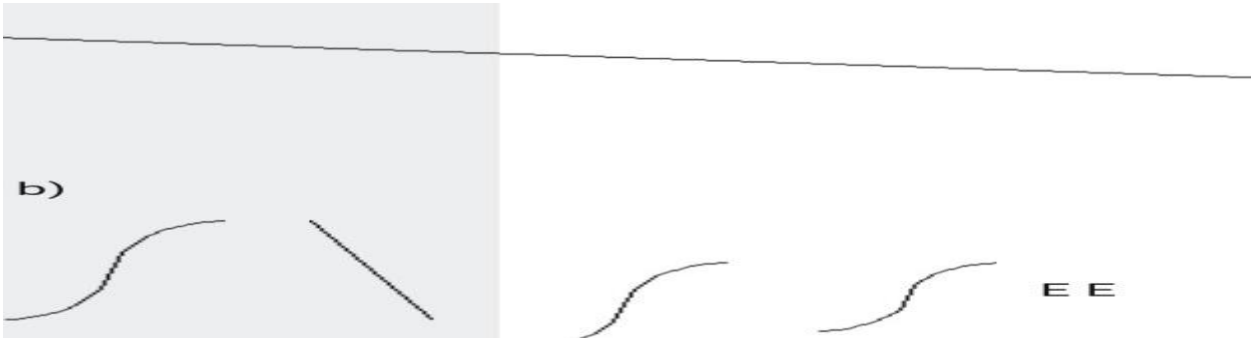
2) amperometric titration with two indicator (polarized) electrodes (abbreviated as biamperometric titration).

In amperometric titration using a chemical reaction that meets the requirements of titrimetry, the amount of polyarographically active component in the solution varies in the volume of the solution. The amperometric titration curve consists of two straight lines, the intersection of which corresponds to the equivalence point. The shape of the curve depends on the polyarographic activity

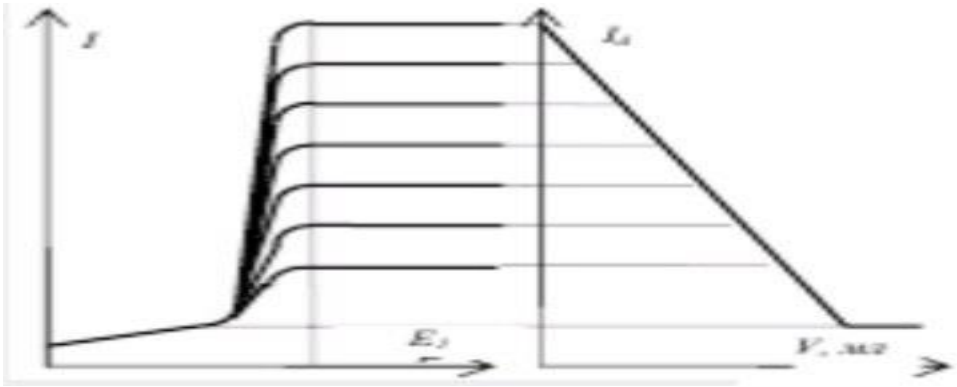
ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

of one of the components that participate in the chemical reaction (the equivalence point is determined by the current); in other words, which component of the titration reaction - analyte, titrant, or reaction product - depends on whether the electrode reacts?

Practical use. Volt-amperometry is used to detect most metals. This method determines the content of ancient, cobalt, copper, lead, manganese, nickel, tin, zinc, iron, bismuth, uranium, vanadium and many other metals in ores, concentrates, alloys and other natural and technical objects.[7]



It is also possible to identify most organic compounds. With a significant difference in half-wave potentials (ΔE1 / 2≥1.0V), several components in a mixture can be quantitatively determined without separating them from each other. Biologically important materials: widely used in the study of blood, serum, etc.



Relationship between polygraphy and ammetric analysis.

Amperometric titration uses cations and anions in various natural and industrial waters, mineral raw materials and products of their processing.

Since the voltammetric method is much more versatile, it can be used to examine a wide variety of objects. In polyarographic analysis, the error is ±2% for solutions with a concentration of 10-3-10-4 mol/l under normal conditions and up to ±5% when processing with more dilute solutions.[8]

Thus, the amperometric method of analysis differs from other analytical methods in the following advantages:

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

1. Amperometric titration is characterized by speed, selectivity, sensitivity and can be carried out in dilute solutions of 10-5 mol/l or more, in cloudy and colored solutions.

2. The amperometric titration device is cheaper than others and requires less time for analysis;

3. Unlike other electrometric methods, this method allows you to determine the amount of a substance in highly dilute solutions (more dilute than in the polyarographic method) due to low mu.

4. The possibility of using various electrodes for titration, for example: platinum, gold, silver, tantalum, etc. to.;

5. Possibility of carrying out amperometric titration in three different media: aqueous, anhydrous and mixed; 6. Ability to use different reactions; (reactions of precipitation, complex formation, oxidation-reduction, and in some cases, neutralization). In a word, the accuracy of amperometry is high (10-6 and higher), and the error does not exceed 1%.

LITERATURE

1. A.A. Yusupkhodzhaev, M.S. Saidov. Physical and chemical methods of analysis. Reading Tutorial. Tashkent-2020. 9-b.

2. Aziz Amin, Hasna Muhammadi. Amperometry.

https://www.researchgate.net/publication/329380844.2018.p.2

3. Ganiev Bakhtiyor Shukurullaevich, Kholikova Gulyaira Kuldoshevna, Sadullaeva Gulmira Gaybullaevna, Salimov Furkat Gairat Ugli, Aslonova Ferangiz Sadilloevna USING THE CHEMSKETCH PROGRAM IN THE PROCESS OF STUDYING ORGANIC CHEMISTRY TO INCREASE STUDENTS' PERFORMANCE // Universum: psychology and 2021. No. 12 (90). URL: https://cyberleninka.ru/article/n/ispolzovanie-programmy-chemsketch-v-protsesse-izucheniya-organicheskoy-himii-dlya-povysheniya-uspevaemosti-uchaschihsya (Date of access: 01/15/2022).

4. Sadullaeva Gulmira Gaybulla Kizi, Dzhumaeva Makhfuza Kayumovna SYNTHESIS, STRUCTURE AND PROPERTIES OF NI(II) AND ZN(II) COMPLEX COMPOUNDS BASED ON BENZOYLUXUS ALDEHYDE // Universum: chemistry and biology. 2021. No. 12-2 (90). URL: https://cyberleninka.ru/article/n/sintez-struktura-i-svoystva-ni-ii-i-zn-ii-kompleksnyh-soedineniy-na-osnove-aldegida-benzoiluksusa (Date of access: 01/15/2022).

5. Safarova N. S. Some ways to increase the educational and conscious activity of students of medical institutes in chemistry classes // European Journal of Research and Reflection in Educational Sciences Vol. - 2020. - T. 8. - No. one.

6. Gulamova M.T., Dzhumaeva M.K. ABOUT THE WORK OF "ROMUZUL AHADIS" AHMAD ZIYAVUDDIN AL-KUMUSHHANAVI // Universum: social sciences: electron. scientific magazine 2021. 11-12(79). URL: https://7universum.com/ru/social/archive/item/12788 (date of access: 01/15/2022).

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

7. Karimov Zhavokhir Sobirzoda, Niyazov Laziz Nurhonovich THIOUREA DERIVATIVES WITH HYDROXYBENZOIC ACIDS // Universum: chemistry and biology. 2021. No. 8 (86). URL: https://cyberleninka.ru/article/n/proizvodnye-tiomocheviny-s-gidroksibenzoynymi-kislotami (date of access: 01/15/2022).

8. Niyazov L.N., Bakhromov H.K., Gapurov U.U. .– No. 4. -74-78 b.

9. Niyazov L.N., Brel A.K., Bahromov H.K., Salicyl acid amidi thuzining aminobutane acid bilan synthesis.//Bukhara Technological Institute: Development of science and technology scientific and technical journal. -2020. - No. 5. - S. -44-46 b.

10. Niyazov L.N. On the magnetic orientational phase transition under the influence of biaxial stress in a single crystal Ho0.6Y2.4Fe5O12 // Development of science and technology. - 2015. - No. 2. - P. 125-129

11. Gapurov U. U., Niyazov L. N. TOPICAL ISSUES OF OBTAINING DERIVATIVES OF SALICYLIC ACID WITH P-AMINO-BENZOIC ACID FOR PHARMACEUTICS // Universum: chemistry and biology. – 2021. – no. 8 (86). - S. 64-66.

12. [1] Aminjonova, C. (2021). Problems and methods of teaching the subject “Biology”. Center for Scientific Publications (buxdu.uz), 1(1).

13.[2] Akmalovna, A. C. (2022). Characteristics and Advantages of Soybean Benefits in Every way. Journal of Ethics and Diversity in International Communication, 1(8), 67-69.

14.[3] Aminjonova, C. A. (2021). Methodology and problems of teaching the subject “Biology” in medical universities. Smolensk medical almanac, (1), 15-18.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

ANALYSIS AND REVIEW OF THE POSSIBILITIES OF APPLICATION OF SATELLITE COMMUNICATIONS IN 5G NETWORKS

R.R.Ibraimov,

D.A.Davronbekov

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *The main technical requirements for 5G networks are given, the integration of satellite systems with the terrestrial infrastructure of 5G mobile operators is discussed. The statements of experts from the world's leading companies involved in the development of 5G networks are given and a summary is provided on this issue.*

Key words - 5G (5th Generation - fifth generation), Gbps, digital processing.

Introduction. 5G (5th Generation - fifth generation) is the official name of the mobile communication standard following the fourth generation. It is a further development of technologies designed to expand the possibilities of Internet access using radio access networks.

It is assumed that 5G networks will be a collection of new and existing radio interfaces that will create a single wireless infrastructure that provides the widest range of services. The use of new and existing services will serve as an incentive for a significant increase in traffic in mobile networks.

The main technical requirements for 5G networks are:

– the maximum achievable data transfer rate under ideal conditions for one subscriber terminal should be 20 Gbps (to the subscriber) and 100 Mbps - 1 Gbps (from the subscriber);
– achievable data transfer rate available throughout the coverage area to the subscriber/device 100 Mbps - 1 Gbps;
– the average data throughput per unit of spectrum resource and per cell should increase by 2-5 times compared to LTE-Advanced;
– energy efficiency will increase by 100 times compared to LTE- Advanced;
– the time delay in the radio interface should be up to 0.5 ms (for URLLC) and up to 4 ms (for mMTC);
– the maximum mobility (in km/h) of the subscriber, achieved with a given quality of service (QoS) and continuity of control transfer, can be up to 500 km/h;
– the total speed of traffic served per unit of geographical area must be ≥ 10 Mbps/ sq.m;
– the total number of connected or available subscriber terminals per area unit (per sq. km) must be ≥1 million / sq.km.

Realization of such parameters will allow 5G to provide a universal connection of everything to everything, combining wideband, energy -consuming protocols with narrowband, energy-saving ones. This will open up new directions inaccessible to 4G: machine-to-machine communication on the ground and in the air, industry 4.0, the Internet of things.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Problem statement. In recent years there has been a resurgence of interest in satellite communications and the concept of using low orbit (LEO) satellite constellations such as OneWeb and SpaceX has been widely discussed. [1, 15] when organizing broadband access, as an addition to well-known satellite systems, such as, for example, Iridium. In turn, the integration of such satellite systems with the terrestrial infrastructure of 5 G mobile operators will make it possible to cover hard-to-reach territories with modern networks and provide communication networks with universal connectivity of "everything, anytime, anywhere" (anything, anytime, anywhere connectivity).

Already in the 1990s, a number of satellite communications projects (Iridium and Globalstar), but they were of limited use and so the rapid growth of terrestrial networks seemed more cost-effective.

Interest in space communications has revived, somewhere since 2014, this has contributed a lot to the progress of technologies and requirements for ensuring universal connectivity. Advances in microelectronics have made it possible to use technologies such as multi-directional (multipoint) antennas, built-in digital processing (onboard digital processing) of the radio signal, as well as improved modulation and signal coding schemes [2]. The duration of development and the cost of equipment for satellite communications continued to decrease significantly.

The introduction of 5G standards provides a unique opportunity to redefine the concept of satellite communications. 3GPP seizes this opportunity and is conducting a series of studies on the development of 5G solutions for satellite communications. Academia is also working closely in this area. It should be noted that similar work is being carried out on the use of satellites in 4th generation cellular communication systems 4G (LTE) [3].

Until recently, satellite systems were mainly intended for redundant communication channels of terrestrial systems. However, it is known that terrestrial systems, for economic reasons, are unable to cover absolutely the entire territory of the Earth. Communication satellites can cover large areas, so they are attractive for use in remote oil fields, geophysical exploration, offshore oil platforms, ships, communications and broadband access in aircraft, etc. M2M machine-to-machine communications and telemetry can also be included in the scenario for using satellite communications. It is also indispensable in natural disasters, when terrestrial communication networks are disrupted.

Satellite communications are also indispensable for improving the quality of services with unreliable terrestrial communications. Therefore, the integration of satellite channels with terrestrial cellular networks will improve the reliability of the latter, especially when the subscriber moves between areas of the "island" coverage of terrestrial mobile networks.

Solution. ***The concept of using the 5G satellite segment.*** Continuous coverage of sparsely populated and uninhabited regions with terrestrial 5G networks, provided that the millimeter wave is used, is not economically feasible. Therefore, there is a need to study the possibility of using the satellite segment of the network for these purposes, since it is possible to require from 5G communication networks the universal connectivity of "everything, always and everywhere" only if the continuity and globality of their provision is ensured [4, 9-14].

When creating 3G networks (IMT-2000), for the global provision of services, the presence of a satellite segment was provided. However, in the future, when developing 4G networks, the global

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

coverage of these networks was not even considered, suggesting the possibility of introducing converged solutions for satellite and terrestrial mobile communications.

The concept of using the 5G satellite segment is proposed, which will be based on the following prerequisites [5]:

– mobile and fixed communication networks will be integrated with the satellite segment, with the core being the integration of the 5G satellite and terrestrial segment;
– space communications systems will be the basis for the continuous and reliable provision of 5G services in all regions of the globe at all times and at an affordable cost;
– the satellite segment should provide globality, allowing you to increase the capabilities of 5G services and solve the problems of the growth of multimedia traffic, M2M and mission-critical telecommunications tasks in order to optimize the cost for subscribers;
– provide for the possibility for the space segment to become part of a hybrid network configuration, including a combination of broadcast and broadband infrastructures and managed in such a way that they can organize uninterrupted and immediate convergence of 5G services for all subscribers.

The requirements for the satellite segment integrated with 5G networks are determined by the set of services provided and they are united by three main business models [6]:

– enhanced mobile broadband (Enhanced mobile broadband - eMBB);
– mass connection of machine-type devices (Massive Machine - Type Communications - mMTC);
– ultra-reliable low-latency communication (uRLLC - ultra - Reliable Low Latency communications).

The existing characteristics of space communication networks, as well as future development trends in satellite technologies, determine the ability of satellite networks to use the following scenarios.

From the eMBB scenario. Here, satellite networks must support data rates of up to several Gbps to meet the demands of advanced mobile broadband services. Modern satellite technologies are capable of broadcasting thousands of channels with content requiring bit rates corresponding to HD and UHD. Such transmission rates will allow, in the future, to support the services of the next generations of mobile networks. Many 2G/3G mobile transport networks in the world are already using satellite channels, and modern space vehicles (SV) of the current and next generations (HTS) located in geostationary and non-geostationary orbits will be able to support the transport infrastructure of 4G/LTE and 5G mobile networks in the future.

From the mMTC scenario. SCADA control technology and other global applications designed to track cargo and objects with Internet of Things (IoT) devices use satellite communication channels. Satellite systems can be scaled to support IoT devices and services in a forward control channel or as backlinks to IoT and M2M devices from remote locations, from ships and other vehicles.

From the uRLLC scenario. As you know, satellite systems are highly reliable and can provide the necessary signal delay in the network. Such networks are mainly used by international broadcasting systems, mobile operators, government communications and commercial customers who are critical to ultra-reliable communications. Delay of signals during use Geostationary space

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

vehicles have a rather high signal delay, however, many applications of 5G networks are not critical to them. For those for whom a large delay is not acceptable, modern and future medium- and low-orbit satellite networks can be used.

The four main scenarios considered for the integration of the satellite segment for 5G networks (IMT-2020) may include [7]:

- trunking and head-end Feed;
- backhauling and Tower Feed;
- communications on the move;
- hybrid multiplay.

The high capacity and global coverage provided by satellite networks will expand the capabilities of the terrestrial segment of 5G networks under these scenarios.

Projects of leading manufacturers. Companies - Boeing [5] and Samsung [8] have already made a preliminary presentation of their projects for the deployment of the satellite segment in 5G networks.

Boeing has requested permission from the US Federal Communications Commission to launch into non-geostationary satellite orbit (NGSO), fixed satellite service (FSS) networks, a spacecraft capable of operating in Earth orbit (LEO) in the 37.5-42.5 GHz band (space -Earth) and in the frequency bands 47.2–50.2 and 50.4–52.4 GHz (Earth-to-space), to solve the problems of the 5G satellite segment.

Boeing 's NGSO system is positioned as a 5G satellite segment [4]. It is also intended to provide various advanced communication and 5G Internet services to a wide range of earth stations and V-band subscriber terminals. Subscriber terminals in this range are equipped with modern antenna arrays that allow you to generate and receive broadband signals with different bandwidths. For higher throughput, terminals with multi-channel and multi -polarization modes are used.

A set of 2956 NGSS FSS spacecraft, to provide high-speed access with low latency for subscriber terminals connected through access gateways to the 5G network and to the associated terrestrial fiber-optic communication line [16-19], will represent the Boeing NGSO system. The system gateways are expected to be located outside densely populated regions where consumer demand for 5G services is low. The satellites of the system will have to form beams covering cells with cell diameters ranging from 8 to 11 km on the Earth's surface in the area of the total coverage area of spacecraft.

Obviously, NGSO system gateways will use the same V-band as the earth terminals. Gateways will provide selection of signals both in frequency and polarization. By providing gateways with more than one antenna, there will be simultaneous access to multiple NGSO satellites visible from the gateway.

At the first stage, the Boeing NGSO system will include 1396 LEO satellites, at an altitude of 1200 km. The satellites will be in 45-degree inclined 35 circular orbital planes, which will be complemented by six additional 55-degree inclined circular orbital planes. In antenna beam-forming, the payload of the NGSO system will use advanced space-time processing and on-board digital

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

processing to form thousands of narrow-band beams for the satellite segment of the 5G communication network on the surface of the Earth.

In the uplink or downlink, satellite links will have up to five 1 GHz bandwidth links, with a total bandwidth of up to 5 GHz, depending on the amount of instantaneous capacity required by the cell being served by the beam. Channels in the uplink can be connected to any channel in the downlink according to the interconnection algorithm used.

It is possible to use a satellite network for FSS channels and their spectrum sharing with a terrestrial 5G network in the range of 37.5-40.0 GHz in the following cases:

– if the 37.5-40.0 GHz band is used only for downlink reception of the FSS satellite network;
– spectrum sharing is possible only at high viewing angles of spacecraft;
– ensuring high transmission rates is possible in the case of using methods of spatial selection (beamforming) both by antennas of satellite network terminals and by 5G network equipment.

ITU limits on *power flux-density* levels, while meeting the requirements of a minimum signal level reduction from the 5G network to 0.2-0.6 dBW, will protect the terrestrial segments of the 5G network from the influence of interference from the downlink of the FSS satellite network

Boeing 's calculations show, with spectrum sharing, as the power of the base station increases, the number of satellite terminals subject to interference will increase. Therefore, the level of attenuation of interference from 5G networks between satellite receivers of FSS earth stations and transmitters of mobile and base stations of the terrestrial segment must be more than 50 dB.

Boeing 's research, through statistical modeling and interference estimation, has shown that the effective isotropically radiated power (EIRP) of base stations in a 5G network should be limited to 62-65 dBm in a 100 MHz band. In this case, the sharing of FSS and 5G systems is facilitated without limiting the transmission rate in 5G networks.

Thus, the need to cover hard-to-reach territories with modern 5G networks, to ensure universal connectivity from communication networks “everything, always and everywhere”, and also given the role of these networks in the infrastructure of the future digital economy, the use of the satellite segment becomes relevant.

Statement by experts from companies involved in 5G networks. The Russian industry, for example, is skeptical of us and considers the joint use of satellite and mobile infrastructure for 5G looks more like a reserve for the distant future, which is unlikely to be applied in practice. Therefore, we present the opinions of experts from the world's leading companies involved in the implementation of 5G networks.

In February 2020, an agreement was signed in Frankfurt between the NGMN alliance (-combining mobile operators, vendors and research institutes) and the EMEA satellite communications operators association (ESOA). NGMN CEO *Peter Meissner* said after signing the agreement: “We are proud to have demonstrated the potential of integrating terrestrial networks and NTN networks (networks using air or space vehicle for data transmission) to provide Internet and mobile communications in remote areas. By 2025, we expect the full deployment of NTN networks

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

to solve the problems of mobile network operators and enterprises of vertical sectors of the economy in terms of reachability, availability and fault tolerance. This will have a significant impact on the expansion of 5G connectivity."

Dmitry Konarev, a leading expert on Huawei wireless technologies in Russia, drew attention to the fact that when working on the further development of the fifth generation standard, 3GPP laid the possibility of integrating the standard with satellite communication systems in Rel.17. He further noted, "The development of this release is in full swing, the end of the formation of specifications is expected by mid-2022. Accordingly, we can speak with full confidence about the evolutionary path of integrating the 5G standard with satellite communication systems." He also noted that Huawei is actively involved in the work on the specifications of the 5G standard and is involved in the work to create an integrated solution.

Commenting on the agreement signed between the NGMN alliance and EMEA, Sergey Pekhterev, head of the AltegroSky group of companies, said that "This document is some general intentions and capabilities of satellite technologies to provide communication with base stations operating in the 5G standard, and the specific implementation depends on local conditions and their features. As an example, he stated that "for many countries, services based on low-orbit constellations such as OneWeb and StarLink, which have not yet gained access to the Russian market, will be promising." He also noted that "most of the Russian mobile operators have their own satellite communications networks and the corresponding infrastructure. Therefore, most likely, the degree of involvement of Russian satellite operators in providing channels for 5G will not be as wide as it could ideally be."

In confirmation of the words of Sergei Pekhterev, the press service of PJSC MegaFon reminds that satellite communications have long been used to connect base stations of existing standards in hard-to-reach places. At the same time, they note: "The question of the prospects for using satellite communications for organizing 5G network coverage will depend on the specific end service and delay requirements, as well as the availability and cost of the satellite resource."

Daria Kolesnikova, a spokeswoman for Tele2 (T2 Mobile LLC), expressing the company's opinion, states that "there are doubts that satellite operators can provide sufficient channel capacity for the development of 5G networks. Moreover, the company believes that the lease of channels is quite expensive for mobile operators, so a separate issue is the commercial payback of such cases.

As the representatives of the operator PJSC VimpelCom (Beeline) note, "At the moment, they see no prerequisites for changing the existing model of interaction with satellite operators when organizing coverage of remote territories. When implementing 5G, especially in industrial enterprises with their specific cases of smart production, it is important to bring the nodes on which user traffic is processed as close as possible to the base stations. The implementation of this approach, including based on MEC solutions (Mobile edge Computing), fits perfectly into our network architecture development strategy, but will be extremely difficult for any 5G satellite operator."

In "Beeline" does not see big pluses from the possibility of integration with satellite operators. The press service says: "In the early stages of 5G development, attempts to "join forces" in practice may lead to additional restrictions on the use of frequencies for mobile operators when introducing

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

5G networks throughout the country. The company is for a clear separation of frequency bands for satellite and terrestrial 5G segments."

The leading research center on the basis of the Skolkovo Institute of Science and Technology, represented by the head V.Shub, believes that the need to combine the efforts of mobile and satellite operators may be associated with a shortage of radio frequency resources. He explains his idea as follows: "We are witnessing a process when each next generation of cellular communication squeezes operators higher and higher on the scale of the frequency spectrum. For GSM, the bands 800, 900, 1800 and 1900 MHz are used, for 3G / WCDMA - 2100 MHz, for LTE - up to 2500-2600 MHz. For networks of the fifth generation, the root range will already be 3400-3800 MHz, which is bad for indoor coverage, especially in the case of strong metallization of windows in office buildings. Therefore, it turns out that cellular operators have to install more and more base stations, worsening the business case."

To get out of this situation, V.Shub proposes refarming of the low- frequency resource used for 2G, 3G, 4G. For example, the USA (600 MHz, 700 MHz, 850 MHz) and Europe (700 MHz and 800 MHz) see the prospect of launching 5G networks in the range below 1 GHz. "At the same time, it should be borne in mind that 5G requires the allocation of wide free carriers, which cannot always be allocated in these low-frequency ranges. In our opinion, Russia should follow this example of the USA and the European Union - give the 600-800 MHz range - "digital dividends" - to 5G, and leave the frequency band between 500 MHz and 600 MHz for broadcasters to solve social problems.

The key idea, according to the head of the leading research center, is that in the process of changing generations of cellular communication, mobile and satellite operators found themselves on the same "frequency field" in high ranges. "Obviously, the proposed Rel.17 3GPP is an attempt to harmonize their interests. It is possible that in the end some new techniques will be found. But our old calculations showed that you can provide indoor coverage from satellites only if they operate in the range of about 700 MHz. However, this may require a lot of work, since, according to our preliminary studies, it would be necessary to launch low -orbiting satellites or satellites on a high ellipse with sufficiently high energy performance of the transceivers on board. Yes, it is theoretically and technically possible, but in the end everything will be put in its place by the business cases of mobile operators."

A.Ganitsev, Ericsson Development Director for Eastern Europe and Central Asia, also supports the idea of combining the efforts of mobile and satellite operators to obtain the possibility of sharing a common frequency resource. He believes that the most popular 3.5GHz band will also be available for 5G NR with this approach. "The 5G application contains several significant areas - these are FWA fixed wireless access, eMBB mobile broadband access and URLLC ultra-low latency solution," lists Alexey Ganitsev. Currently, he continues: "Fixed wireless access has become widespread, for example, in Latin America, specifically for the tasks of providing high-speed connections in remote areas. Implementation of Critical Internet of Things applications (Critical IoT) is possible based on the creation of private 5G networks in remote areas with the organization of satellite communication channels. However, the disadvantages of such solutions are the cost of the satellite transport network and low bandwidth."

The idea of integrating space systems with the terrestrial infrastructure of mobile operators, taking into account the 3GPP decision to include NTNs technology in Rel.17, Tigran Pogosyan, *the*

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

senior vice president of *ZTI-Svyaztekhnologii* LLC (ZTE in Russia), allows only in the future, since in practical implementation at the moment it is practically unrealizable. He believes that “Satellite bands tend to be narrowband, which is not enough for 5G. It is also necessary to take into account their congestion with current consumers - television, military and special services, etc.

A ComNews source in the telecommunications market believes that “Theoretically, the emergence of commercial satellite constellations in low and medium orbits will significantly speed up the speed of data transmission over the satellite. Such transmissions will definitely be faster than those that operators use today to connect base stations in remote areas. However, there is no certainty that the level of satellite signal delay (latency) even when using MEO constellations will be sufficient to meet the requirements of 5G networks. As for low-orbit satellites, there are questions about the timing of their launch.”

The proposal to include satellite access in the 3GPP Rel.17 specification, according to the ComNews interlocutor, looks more like a reserve for the distant future and is unlikely to be applied in practice. In conclusion, the source believes that "The initiative describes the ability of 5G user devices to automatically switch between 5G and the satellite network, as is the case today between LTE and 2G. This is a very specific use case, and given the power consumption of satellite modems, such solutions are more likely to have a fixed, than mobile performance."

Conclusion. Summarizing the above statements of experts from leading world companies developing and implementing 5G networks (on the example of Russian ones), we can assume that today some experts (Russian) doubt the prospects for a symbiosis of satellite communications and 5G networks. However, most experts believe, including the authors, that ".... with full confidence we can talk about the evolutionary path of integrating the 5G standard with satellite communication systems."

References

1. http://licensing.fcc.gov

2. del Portillo Barrios, Inigo & Cameron, Bruce & Crawley, Edward. (2019). A technical comparison of three low earth orbit satellite constellation systems to provide global broadband. Acta Astronautica. 159. 10.1016/j.actaastro.2019.03.040.

3. Bastia, Francesco & Bersani , Cecilia & Candreva , Enzo & Cioni , Stefano & Corazza , Giovanni & Neri , Massimo & Palestini , Claudio & Papaleo , Marco & Rosati , Stefano & Vanelli-Coralli , Alessandro. (2009). LTE Adaptation for Mobile Broadband Satellite Networks. EURASIP Journal on Wireless Communications and Networking. 1-13. 10.1155/2009/989062.

4. V.O.Tikhvinsky, M.V.Sagittarius. Prospects for creating a 5G satellite segment. Magazine «First mile» № 1, 2018

5. Jonas Eneberg. Satellite Role in 5G. Inmarsat, 2017.

6. Mah Daniel CH Role of Satellite in 5G. SAS, Satellite Connectivity Workshop, Nadi, Fuji, 24 April 2017.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

7. Evans Barry, Onireti Oluwakayode, Spathopoulos Theodoros, Imran Muhammad Ali. The role of satellites in 5G. 23rd European Signal processing conference (EUSIPCO), 2015.

8 Farooq Khan Mobile Internet from the Heavens. Samsung Electronics. Richardson, Texas, 2015.

9. Davronbekov D., Khakimov Z., Isroilov J. Features Identifiers Implemented in the Context of Generations of Mobile Cellular Development / International Journal of Advanced Trends in Computer Science and Engineering, Volume 9, No.5, September – October, 2020. - P.8753-8757

10. Davronbekov D.A., Matyokubov U.K. The Role of Network Components in Improving the Reliability and Survivability of Mobile Communication Networks / Acta of Turin Polytechnic University in Tashkent. 2020, Vol.10: Iss.3, Article 2. - pp.7-14.

11. Давронбеков Д., Исроилов Ж., Хакимов З. Архитектура организации регистрации IMEI-кодов в базе данных информационной системы идентификации мобильных устройств / International scientific journal "Science and World", №10 (86), 2020.-P.39-43

12. Davronbekov D.A., Khakimov Z.T., Isroilov J.D. Implementation of the Algorithm for Checking and Registering Mobile Devices in the Information System Using the IMEI Code / International Journal of Advanced Research in Science, Engineering and Technology. Vol. 7, Issue 10, October 2020. - p.15054-15059

13. Davronbekov D.A., Matyokubov U.K. The Effect of the Number of Backup Communication Lines in the BTS-BSC System on Reliability / Scientific Collection «InterConf», 40: Proceedings of the 2nd International Scientific and Practical Conference "Scientific Community: Interdisciplinary Research", January, 26-28, 2021, Hamburg, Germany: Busse Verlag GmbH, 2021. – p.679-684

14. Davronbekov D.A., Matyokubov U.K., Abdullayeva M.I. Evaluation of Reliability Indicators of Mobile Communication System Bases / Bulletin of TUIT: Management and Communication Technologies: Vol. 3 , 2020, Article 1.- p.1-9.

15. Давронбеков Д.А., Ибрагимова П.А., Давронбеков Н.Д. Применение систем спутниковой навигации в различных областях жизнедеятельности / Scientific Collection «InterConf», 2(35). Proceedings of the 1st International Scientific and Practical Conference «Experimental and Theoretical Research in Modern Science», November 16-18, 2020, Kishinev, Moldova: Giperion Editura, 2020. – C.622-626

16. Davronbekov D.A., Khakimov Z.T. Research of FOCL Parameters in the Range of Positive Temperatures / Bulletin of TUIT: Management and Communication Technologies: 2021, Vol. 4 , Article 3.- p.1-9

17. Давронбеков Д.А., Хакимов З.Т., Исроилов Ж.Д. Нейро-нечеткое моделирование экспериментальных данных по оптимизации спектральных характеристик ВОЛС / Acta of Turin Polytechnic University in Tashkent. -2021, Vol.11. – C.55-70.

18. Давронбеков Д.А., Жумамуратов И.К. Особенности применения ВОЛС в системах мобильной связи / Scientific Collection «InterConf», №2(35). Proceedings of the 1st International

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Scientific and Practical Conference «Experimental and Theoretical Research in Modern Science», November 16-18, 2020, Kishinev, Moldova: Giperion Editura, 2020. – С.627-632

19. Давронбеков Д.А., Хакимов З.Т., Исроилов Ж.Д. Определение границы технологического запаса оптического волокна с прямолинейными элементами / Scientific Collection «InterConf», 2(38): Proceedings of the 1st International Scientific and Practical Conference «Science, Education, Innovation: Topical Issues and Modern Aspects», December 16-18, 2020, Tallinn, Estonia: Uhingu Teadus juhatus, 2020. - С.1163-1169

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

FEATURES OF PSYCHO-CORRECTIONAL WORK TO REDUCE FRUSTRATION AMONG STUDENTS OF HIGHER EDUCATIONAL INSTITUTIONS

Boymirzaeva D. D.
Namangan State University., Uzbekistan.

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *This article describes a psycho-correctional program implemented in the course of psychological support for students, which is aimed at understanding and overcoming the destructive influence of frustration and its causes by students.*

Key words: *frustration, psycho-correction, self-regulation, empathy, reflection, sanogenic thinking.*

As practice shows, the student period is accompanied by psycho-emotional stress, a variety of conflict and stressful situations in educational activities, interpersonal communication. The new social environment, the complexity and inconsistency of the needs, desires, goals, motives, opportunities, conditions and available resources of students can encourage the development of frustration, concomitant mental states, which requires their awareness, analysis, overcoming, actualization of other forms of response, behavior, the formation of new skills and self-regulation skills.

The means and methods of overcoming and regulating these states used by students, as a rule, are formed by their past experience and are determined by the characteristics of the nervous system, individual psychological characteristics. At the same time, they are often ineffective and are mainly used spontaneously, unconsciously, they can acquire forms of stereotyping, rigidity, and their use in the educational process occurs only partially.

The emergence, intensification and predominance of frustration, concomitant mental states in students leads to the disorganization of educational activities, sometimes even to a complete rejection of it, disturbances in the course of cognitive processes, self-development processes, self-organization, personal and professional-personal deformations, maladjustment, health disorders, blocking internal resources, etc. [4].

Thus, based on the analysis of scientific literature on the problem under study, the results of the empirical study, a special psycho-correctional program has been prepared, which is implemented in the course of psychological support for university students. This program, first of all, is aimed at understanding and overcoming by students the destructive influence of frustration and its causes.

The development of the program was based on the following principles of psycho-correction:

- the principle of individual autonomy;
- the principle of normativity and individuality of development;
- the principle of personal growth;
- the principle of systematic development;
- activity principle of correction;
- the principle of personal motivation;
- the principle of psycho-correctional contact and equality of positions;

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

- the principle of unity of diagnostics and correction.

When preparing the psycho-correctional program, the position was maintained that psycho-correctional work should be aimed at a systemic, holistic and complex impact on the mental states of students and on the conditions for their occurrence. Based on this, the program includes an appropriate complex, which provides for psychological education, psycho-corrective exercises, psychological relief techniques, psychological recommendations, etc.

The methods of psychological influence provided for in the program are mainly aimed at:

- formation of an active position of students on the conscious regulation of mental states, reducing internal tension, increasing emotional stability;
- awareness and acceptance of these states, their reflection, changing personal meanings, increasing motivation for success and positive self-perception;
- development of self-confidence, subjective position;
- development of emotional intelligence, empathy, emotional flexibility, expressiveness, constructive forms of response;
- formation of skills of self-management by mental states, self-regulation;
- expanding the range of positively colored mental states, activating the mechanisms of self-consciousness and self-development.

The psycho-correction program itself basically contains three main structural blocks that combine 16 relevant classes, including various, specially selected and most effective exercises, techniques, etc.

The first block covers sessions 1 to 5, which are mainly devoted to getting to know the respondents, relieving mental stress, creating comfortable conditions for psychological work, increasing group cohesion, familiarizing themselves with the features, characteristics, signs, manifestations, the influence of frustration and means of their regulation.

The second structural block of the psycho-correctional program covers sessions 6 to 11, which are aimed mainly at working with frustration, in particular with increased anxiety, aggressiveness, rigidity, emotional expansiveness, the manifestation of a dependent, aggressive type of interpersonal relationships, impaired adaptation to educational activities and provide for the development of skills their recognition, differentiation, identification of the causes, conditions of occurrence, development of the formation of new semantic attitudes of students.

The third structural block of the psycho-correction program covers lessons from 12 to 16, which contribute to the activation of the resource states of students, expanding the arsenal of skills for the formation of positive mental states, increasing the level of self-acceptance, developing reflection, awareness of other people's perception of themselves at the moments of experiencing negative and positive mental states, their influence on interpersonal interaction, revealing the state of frustration, developing emotional flexibility and self-control over the external expression of emotions, etc.

As a rule, each scheduled lesson has a standard structure, i.e. includes three main parts:

- introductory, which highlights the subject of the lesson, the work plan, creates a favorable, working atmosphere in the group with the use of exercises to increase group cohesion and self-disclosure of students;
- the main one, which includes an informational message to increase the level of students' awareness and a set of exercises, according to the subject of the lesson;
- final, which covers the reflection of the lesson, summing up.

The duration of the entire psycho-correction program is designed for 2-3 months, taking into account the classes no more than 2 times a week and no more than 1.5 hours per session.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

The starting point in the correction of the state of frustration is the process of objectification of the subjective mental state, the corresponding emotions, experiences, feelings, thoughts, i.e. isolation of frustration as a separate object and its removal to the external environment.

In this aspect, many researchers pay attention to the action of the processes of centralization and decentralization in order to ease internal tension, accompanied by a narrowing of the field of consciousness and the concentration of the respondent on their own experiences. For example, intellectual decentralization occurs due to the activation of reflection processes, when a student tries to look at himself from the outside and analyzes the situation as an outside observer, and role decentralization is associated with the respondent's mental inclusion in another situation or reincarnation in another subject. Reflection, as a process of self-consciousness and self-knowledge, stimulates the differentiation and awareness of one's psychological qualities, properties and serves as a mechanism for evaluating, creating models and stereotypes of behavior, leads to a change in self-consciousness and self-attitude of the student's personality [5].

Objectification allows you to be aware of the frustration and psychological properties that caused it, consider the mental state in a broader context, from different angles, and consciously change your position, point of view in relation to the state and the situation that caused it. The mechanisms of objectification and reflection encourage respondents to personal changes, form the ability to successfully overcome frustration, consciously regulate and manage not only their mental state, but also consciously determine their own path of development [6].

At the same time, it is important to draw students' attention to the ability to define, identify and name their own mental state, i.e. frustration, since its verbalization transfers internal indefinite experiences into the sphere of consciousness, helps to characterize this state and perceive it as an internal individual experience. At the same time, it is advisable to begin the psycho-correction of the state of frustration first of all with the development of skills to describe, characterize, identify, differentiate the state of frustration. This is what the first classes of the psycho-correction program, informational messages, classes on understanding the state of frustration, understanding the causes of occurrence, characteristic signs of manifestation, etc., are devoted to.

When psycho-correction of the state of frustration, the skills of relaxation, physical and mental relaxation acquire a particularly important place. The tension that accompanies productive educational activity and the rest after it gradually depletes the nervous system and loosens the mental regulation of the student's personality. Especially destructive are frequent failures and long-term stressful situations. In a state of relaxation, conditions for rest are created and the processes of restoration of the body are activated. The formation of appropriate relaxation skills helps to effectively overcome negative mental states and neutralize their consequences, replenish the body's reserves. Relaxation techniques are successfully used in combination with suggestion and self-hypnosis. In a state of relaxation, the tone of the brain and the level of activation of mental activity decrease, it helps to reduce the manifestation of the state of frustration and the emergence of positive states of peace, joy, pleasure, etc.

Self-hypnosis against the background of relaxation is easily fixed and causes physiological changes in the body. Suggestion with reduced criticality becomes an internal setting of the personality, regulates, stimulates and directs mental activity. Also, in a state of relaxation, pain sensitivity decreases, attention concentration improves, working capacity increases, the ability to mobilize, etc. [3].

The analysis of the scientific literature on the problem under study shows that the technique of progressive relaxation or neuromuscular relaxation allows you to gradually reduce tension and achieve effective relaxation of the main muscle groups. Relaxation of a certain group of muscles

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

reduces emotional and mental stress. This effect is achieved through the experience of contrasting sensations, first of maximum muscle tension, and then their relaxation, characterized by sensations of warmth and heaviness. This technique is quite popular and, as a rule, is used in various modifications [2].

The tone of the facial muscles on the basis of feedback also affects the mental state of the individual. So, relaxation of the muscles of the face, a benevolent expression not only helps to relieve internal tension, but also activates mental, creative activity, increases concentration and distribution of attention, improves vision, and reduces fatigue.

As practice shows, various imitation games are an effective method of influencing the mental state of students. Each person to a certain extent creates for himself and plays a certain image, which is formed under the influence of experience, environment, upbringing, culture. The ability of the respondent to consciously reproduce a certain image is used in this technique. Its essence lies in the fact that first the qualities that one would like to acquire, the image of the person one would like to be are determined.

In order to identify, strengthen or weaken, observation and understanding of their own and others' mental states, as a rule, they develop expressive skills, the skills of manifesting their own mental state. Mastering these skills allows you to significantly expand the possibilities for using a range of expressive means:

- intonations of voice and speech;
- movements, gaits, postures, touches.

Within the framework of this technique, attention is drawn to the awareness of the influence of expressive means on one's own mental state and the state of the surrounding people, the psychological climate in the group, the role of expressive means in interpersonal relations in solving conflict situations is analyzed.

Overcoming negative mental states is impossible without changing the attitude to the sources of their occurrence, changing the perceptions of the relevant situations and the formation of new styles of thinking in difficult circumstances. Rationalization of the state of frustration helps to understand the causes and one's own contribution to its occurrence, in particular, the influence of the direction of thoughts and the nature of assessments of the current situation. Sanogenic thinking helps to control the course of thoughts that lead to the emergence of frustration, and involves arbitrary, conscious reflection on a certain situation in a state of relaxation, peace and detachment, which makes it possible to objectify the mental state. Such thinking requires a high level of development of concentration of attention and knowledge of the features of frustration [1].

As you know, rigid psychological structures do not allow you to effectively adapt to new life circumstances and, accordingly, cause negative mental states, provoking frustration. Sanogenic thinking allows destroying such structures, helps to prevent and neutralize the occurrence of frustration. For example, in the case of an image, the mechanism of action, first of all, reflects the forecast of the behavior of another person, then the real behavior of the person, then the negative emotional reaction, then the negative state caused by the discrepancy between the real behavior and the expected one. If a student is in a state of anxiety, frustration, fear, answers to the following questions will help to overcome them:

- What am I worried about now, what am I worried about?
- What can happen in the worst case?
- Do my experiences correspond to the consequences that may be?
- How can I change the situation for the better? etc.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Awareness and acceptance by students of their negative experiences and reliance on their own positive experience open up new opportunities for personal growth, increase self-confidence, their strengths, the level of claims, set them up for success, thereby helping to overcome frustration.

Among the various techniques for neutralizing the state of frustration, one can also distinguish:

- the technique of rationalization of future events, which reflects the repeated mental detailed reproduction of a certain future situation until it becomes familiar and predictable;
- simulation games that reflect the playing of their roles in front of probable future events;
- a technique of selective positive retrospection, which reflects a consistent and detailed mental repetition of situations that have already ended successfully.

In order to activate positive thinking and form a different view of the corresponding negative situation, a group discussion, analysis of problem situations, group introspection and exercises are used [7].

Thus, the prepared psycho-corrective program, due to the complex effect on the state of frustration, helps to optimize the entire system of regulation of the student's personality, ensures the regulation of its relations, behavior, activities and contributes to the personal development of the student.

References:

1. Ефимов А.А. Саногенное мышление: техника формирования и развития - М.: Изд-во МГУ, 2009. - 69 с.
2. Ефимова Х.Д. Техника прогрессивной релаксации. - М.: Просвещение, 2015. - 54 с.
3. Журавлев Д.Г. Психопрофилактика психических состояний. - М.: Просвещение, 2012. - 63 с.
4. Левитов Н.Д. О психических состояниях человека. М.: 2002. - 342 с.
5. Столяренко В.К. Психокоррекция психических состояний. - М.: Феникс, 2011. - 61 с.
6. Шеламова Е.Р. Психокоррекционная работа в вузе. - М.: Изд-во МГОУ, 2011. - 66 с.
7. Эрбегеева А.Р. Психологическая коррекция состояния фрустрации у студентов в учебном процессе / Эрбегеева А.Р.// Вестник МГОУ. Серия «Психологические науки». № 4. - 2008. - М.: Изд-во МГОУ - С. 54-60.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

APPLICATION OF ECONOMIC MATHEMATICAL MODELS TO BANKING

Salimov D.T.
Tashkent State University of Economics

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *In a modern market economy, there is a need to increase the competitiveness of enterprises. This requires enterprises to optimally manage their financial resources. Based on this optimal control, the need arises for the effective use of mathematical models. This will be the basis for ensuring optimal operation and growth of the enterprise's income in the face of uncertainty. The article analyzes the uncertainty between the banking system and their customers using the total probability and Bayesian formulas based on statistical data.*

Keywords: *financial resources, mathematical modeling, competitiveness, absolute probability, Bayes formula, uncertainty conditions, criteria.*

In the current market economy, the competitiveness of the financial position of enterprises is often based on the effective management of financial resources. Improving such management is done on the basis of statistical data and economic mathematical models.

When we analyze the banking system, there are a lot of uncertainties between the bank and the customers. One of these uncertainties is the credit line of the banking system, in which some customers do not fulfill their loan agreements. To solve such problems, it is necessary to use economic mathematical models based on statistical data.

In this paper, the probability of probability theory and the uncertainty between the banking system and their customers, using Bayes formulas, are analyzed on the basis of statistical data

The main task of the banking system is to identify reliable enterprises that are subject to the terms of the contract in order to ensure optimal operation and revenue growth in the face of uncertainty.

The construction of a mathematical model of an economic system is based on modeling, which consists of 3 stages:

1) the laws of change of the economic system are defined and the mathematical model is created;

2) the method of solving the mathematical model is determined;

3) Based on the results of the mathematical model, the economic system is analyzed and recommended for optimal management.

We will apply the full formula of probability and the Bayes formula to banking.

For example. Three K_1, K_2, K_3 businesses accordingly $216000, $360000, $450000 received a loan from the bank on the condition of repayment for a period of 3 years. The scheme of monthly payment of these funds to the banks is given as follows.

K_1 the scheme of repayment of the loan received by the enterprise to the bank

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

№	date	Balance of principal debt	Principal debt	Interest payment	Total payment
	15.12.2018				
1	10.01.2019	216 000,00	6 000,00	3 385	9 385
2	10.02.2019	210 000,00	6 000,00	3 924	9 924
3	10.03.2019	204 000,00	6 000,00	3 443	9 443
4	10.04.2019	198 000,00	6 000,00	3 700	
5	10.05.2019	192 000,00	6 000,00	3 472	9 472
6	10.06.2019	186 000,00	6 000,00	3 475	9 475
7	10.07.2019	180 000,00	6 000,00	3 255	9 255
8	10.08.2019	174 000,00	6 000,00	3 251	9 251
9	10.09.2019	168 000,00	6 000,00	3 139	
10	10.10.2019	162 000,00	6 000,00	2 929	8 929
11	10.11.2019	156 000,00	6 000,00	2 915	8 915
12	10.12.2019	150 000,00	6 000,00	2 712	8 712
13	10.01.2020	144 000,00	6 000,00	2 691	8 691
14	10.02.2020	138 000,00	6 000,00	2 579	8 579
15	10.03.2020	132 000,00	6 000,00	2 307	8 307
16	10.04.2020	126 000,00	6 000,00	2 354	8 354
17	10.05.2020	120 000,00	6 000,00	2 170	8 170
18	10.06.2020	114 000,00	6 000,00	2 130	8 130
19	10.07.2020	108 000,00	6 000,00	1 953	7 953
20	10.08.2020	102 000,00	6 000,00	1 906	7 906
21	10.09.2020	96 000,00	6 000,00	1 794	7 794
22	10.10.2020	90 000,00	6 000,00	1 627	7 627
23	10.11.2020	84 000,00	6 000,00	1 570	7 570
24	10.12.2020	78 000,00	6 000,00	1 410	7 410
25	10.01.2021	72 000,00	6 000,00	1 345	7 345
26	10.02.2021	66 000,00	6 000,00	1 233	7 233
27	10.03.2021	60 000,00	6 000,00	1 013	7 013
28	10.04.2021	54 000,00	6 000,00	1 009	7 009
29	10.05.2021	48 000,00	6 000,00	868	6 868
30	10.06.2021	42 000,00	6 000,00	785	6 785
31	10.07.2021	36 000,00	6 000,00	651	6 651
32	10.08.2021	30 000,00	6 000,00	561	6 561
33	10.09.2021	24 000,00	6 000,00	448	6 448
34	10.10.2021	18 000,00	6 000,00	325	6 325
35	10.11.2021	12 000,00	6 000,00	224	6 224
36	10.12.2021	6 000,00	6 000,00	108	6 108
	Total:		**216 000,00**	**72 661**	**269 822**
	On a contractual basis		**216 000,00**	**72 661**	**288 661**

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

K_2 the scheme of repayment of the loan received by the enterprise to the bank

№	date	Balance of principal debt	Principal debt	Interest payment	Total payment
	15.12.2018				
1	10.01.2019	360 000,00	10 000,00	5 642	15 642
2	10.02.2019	350 000,00	10 000,00	6 540	16 540
3	10.03.2019	340 000,00	10 000,00	5 738	
4	10.04.2019	330 000,00	10 000,00	6 166	16 166
5	10.05.2019	320 000,00	10 000,00	5 786	15 786
6	10.06.2019	310 000,00	10 000,00	5 792	
7	10.07.2019	300 000,00	10 000,00	5 425	15 425
8	10.08.2019	290 000,00	10 000,00	5 419	15 419
9	10.09.2019	280 000,00	10 000,00	5 232	15 232
10	10.10.2019	270 000,00	10 000,00	4 882	14 882
11	10.11.2019	260 000,00	10 000,00	4 858	
12	10.12.2019	250 000,00	10 000,00	4 521	14 521
13	10.01.2020	240 000,00	10 000,00	4 484	14 484
14	10.02.2020	230 000,00	10 000,00	4 298	14 298
15	10.03.2020	220 000,00	10 000,00	3 845	13 845
16	10.04.2020	210 000,00	10 000,00	3 924	13 924
17	10.05.2020	200 000,00	10 000,00	3 615	13 615
18	10.06.2020	190 000,00	10 000,00	3 550	13 550
19	10.07.2020	180 000,00	10 000,00	3 255	
20	10.08.2020	170 000,00	10 000,00	3 176	13 176
21	10.09.2020	160 000,00	10 000,00	2 991	12 991
22	10.10.2020	150 000,00	10 000,00	2 712	12 712
23	10.11.2020	140 000,00	10 000,00	2 616	12 616
24	10.12.2020	130 000,00	10 000,00	2 351	12 351
25	10.01.2021	120 000,00	10 000,00	2 242	12 242
26	10.02.2021	110 000,00	10 000,00	2 055	
27	10.03.2021	100 000,00	10 000,00	1 688	11 688
28	10.04.2021	90 000,00	10 000,00	1 682	11 682
29	10.05.2021	80 000,00	10 000,00	1 447	11 447
30	10.06.2021	70 000,00	10 000,00	1 307	11 307
31	10.07.2021	60 000,00	10 000,00	1 084	11 084
32	10.08.2021	50 000,00	10 000,00	934	10 934
33	10.09.2021	40 000,00	10 000,00	747	10 747
34	10.10.2021	30 000,00	10 000,00	542	10 542
35	10.11.2021	20 000,00	10 000,00	375	10 375

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

36	10.12.2021	10 000,00	10 000,00	181	10 181
	Total:		**360 000,00**	**121 102**	**409404**
	On a contractual basis		**360 000,00**	**121 102**	**481 102**

К3 the scheme of repayment of the loan received by the enterprise to the bank

№	date	Balance of principal debt	Principal debt	Interest payment	Total payment
	15.12.2018				
1	10.01.2019	450000	12500	7052	19552
2	10.02.2019	437500	12500	6856	19356
3	10.03.2019	425000	12500	6660	19160
4	10.04.2019	412500	12500	6464	18964
5	10.05.2019	400000	12500	6269	18769
6	10.06.2019	387500	12500	6073	18573
7	10.07.2019	375000	12500	5877	18377
8	10.08.2019	362500	12500	5681	18181
9	10.09.2019	350000	12500	5485	17985
10	10.10.2019	337500	12500	5289	17789
11	10.11.2019	325000	12500	5093	17593
12	10.12.2019	312500	12500	4897	17397
13	10.01.2020	300000	12500	4701	17201
14	10.02.2020	287500	12500	4505	17005
15	10.03.2020	275000	12500	4309	16809
16	10.04.2020	262500	12500	4113	16613
17	10.05.2020	250000	12500	3918	16418
18	10.06.2020	237500	12500	3722	16222
19	10.07.2020	225000	12500	3526	16026
20	10.08.2020	212500	12500	3330	15830
21	10.09.2020	200000	12500	3134	15634
22	10.10.2020	187500	12500	2938	15438
23	10.11.2020	175000	12500	2742	15242
24	10.12.2020	162500	12500	2547	15047
25	10.01.2021	150000	12500	2351	14851
26	10.02.2021	137500	12500	2155	14655
27	10.03.2021	125000	12500	1959	14459
28	10.04.2021	112500	12500	1763	14263
29	10.05.2021	100000	12500	1567	14067
30	10.06.2021	87500	12500	1371	13871

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

31	10.07.2021	75000	12500	1175	13675
32	10.08.2021	62500	12500	979	13479
33	10.09.2021	50000	12500	784	13284
34	10.10.2021	37500	12500	588	13088
35	10.11.2021	25000	12500	392	
36	10.12.2021	12500	12500	196	12696
	Total:		**450000**	**130461**	**567569**
	On a contractual basis		**450000**	**130461**	**580461**

Using statistics, the bank should be required to identify non-performing loans.

Solve. Using the above, the bank distributed its credit resources as follows: 21 percent of the loan K_1 to the enterprise, 35% of the loan was allocated to the K_2 enterprise, and 44% of the loan was allocated to the K_3 enterprise. Using the tables, the bank determined that the probabilities of non-repayment of loans of enterprises K_1, K_2, K_3 were 0.065, 0.15, 0.022, respectively. For borrowers, the probabilities of the following hypotheses are included, where N_1 - K_1 is the loan received by the enterprise, N_2 - K_2 is the loan received by the enterprise, N_3 - K_3 is the loan received by the enterprise. This problem is solved using the Bayes formula [1,2]:

$$P_A(H_i) = \frac{P(H_i)P_{H_i}(A)}{P(H_1)P_{H_1}(A)+P(H_2)P_{H_2}(A)+...+P(H_n)P_{H_n}(A)} \quad \left(i=\overline{1,n}\right) \qquad (1)$$

with , A – is an accident and the loan is non-refundable;

$P(H_1)=0,21;\ P(H_2)=0,35;\ P(H_3)=0,44$ – H_1, H_2, H_3 probabilities of occurrence of hypotheses;

$P_{H_1}(A)=0,065;\ P_{H_2}(A)=0,15;\ P_{H_3}(A)=0,022$ – H_1, H_2, H_3 conditional probabilities of event A occurring after the hypotheses have occurred.

(1) The formula for this problem is written as follows:

$$P_A(H_i) = \frac{P(H_i)P_{H_i}(A)}{P(H_1)P_{H_1}(A)+P(H_2)P_{H_2}(A)+P(H_3)P_{H_3}(A)} \quad \left(i=\overline{1,3}\right) \qquad (2)$$

From this we can determine from formulas (2) that enterprises cannot repay loans:

$$P_A(H_1) = \frac{0,21\cdot 0,065}{0,21\cdot 0,065+0,35\cdot 0,15+0,44\cdot 0,022} = 0,18$$

$$P_A(H_2) = \frac{0,35\cdot 0,15}{0,21\cdot 0,065+0,35\cdot 0,15+0,44\cdot 0,022} = 0,692$$

$$P_A(H_3) = \frac{0,44\cdot 0,022}{0,21\cdot 0,065+0,35\cdot 0,15+0,44\cdot 0,022} = 0,128$$

The results of this calculation show that the highest probability of non-repayment of loans is the K2 enterprise, which is equal to 0.692.

This means that the bank will not lend to K2.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

In conclusion, it can be said that the main task of banking professionals is the optimal distribution of loans. Therefore, in order to remain competitive in a market economy, enterprises are required to optimally manage their financial sectors using mathematical models.

References.

1. Кремер Н.Ш. Теория вероятностей и математическая статистика. – М.: ЮНИТИ, 2012. -330 стр.

2. Фадеева Л.Н., Лебедев А.В. Теория вероятностей и математическая статистика. – М.: Эксмо, 2010. -496 с.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

TECHNOLOGIES FOR SHAPING THE DIGITAL CULTURE OF UNDERGRADUATE STUDENTS IN THE INFORMATION-EDUCATIONAL ENVIRONMENT

Maxmudov Abrorjon Zakirovich
Teacher of Namangan State University
E-mail: yangilik2019@gmail.com

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *This article describes in detail the technologies used in the formation of the digital culture of undergraduate students, as well as the processes of rational use of available resources in the rapidly evolving information age.*

Keywords: *digitalization, information technology, digital technology, digital culture, digital fluency.*

Today, modern society is developing rapidly all over the world and its information resources are constantly replenished. Today, the role of students as subjects of professional development, which effectively interact with the content of education, and the role of teachers as mediators and "navigators" in this interaction is significantly increasing. In this regard, there is the problem of readiness of students to form their own educational content through the selection and use of resources of the information learning environment. The urgency of the problem increases in the context of the integration of formal and non-formal education, its personalization in an open information environment and the individualization of education through the practice of individual educational trajectories. The aim of this study was to determine the current state of the interaction of university students with the content of cultural orientation in the digital learning environment. In our research, methodology and research methods, questionnaire method is the main tool of empirical research. Based on the analyzes, the authorship questionnaire was used to identify students ’preferences in the selection and use of educational content and to link the results to teachers’ opinions. The K-means method was used to analyze the data, systematize them, and cluster the respondents. The results and scientific novelty identified the types of digital educational culture content that are most often and least used by students.

The relevance of each type of different educational content is assessed. The choice of content for students is determined by their educational profile (humanities and specialties). In addition, the typological heterogeneity of students in the information learning environment has been proven based on a comprehensive analysis of qualitative and quantitative data. Based on the established indicators of the level of involvement of respondents in educational resources, the data cluster allows the authors to classify typological groups among students ("passive", "active", "advanced", "professional-oriented" and "humanitarian").

It is observed that these typological groups are manifested at different stages of university education (bachelor's degree in IT and pedagogical specialties). Effective and flexible motivation of students to use the educational content was identified. It is noted that students evaluate their

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

performance in relation to the culture of digital education, and the effectiveness of motivation is much higher than that assessed by teachers. The results allow us to say that the personalization of the digital learning culture environment should be structured taking into account the needs of student groups with different interests and motivations to use educational content. The use and use of modern Big Data tools in the organization of vocational training to gather the necessary information about the specific culture and characteristics of the activities of future professionals under the guise of using and communicating content in a digital learning environment 'additional methodological resources should be sought. Research materials and results can serve as a basis for developing recommendations to support and develop students 'interactions with the content of the digital learning culture. In addition, research materials can contribute to changing the meaning of this interaction, which should consist of students understanding their education as an individual professional self-development.

We need to shed more light on how the use of digital technologies can support the transformation of cultural practices in education and teaching to better meet the needs of 21st century higher education students. A brief discussion of the changing needs of students is followed by a review of the overall impact of digital technologies on teaching and learning. Digital technologies are proposed as a way to provide a more active and flexible learning experience by applying a participatory pedagogical approach and mixing formal education with non-formal education. By combining theory and practice, we must achieve high efficiency.

Digital culture refers to the behavior, ethics, and participation of students to engage in Internet technology and communication as part of the learning process and environment. Students are friendly to digital learning materials or mobile devices that change their learning at the same time. The existence of a digital culture can be seen in the use of digital learning resources and mobile devices in the learning process.

As mentioned above, one aspect of digital culture in the learning process of students is the digital fluency of students.

The term digital fluency can be understood from M. Reznik's argument. Recognizing the situation in the United States at the beginning of the 21st century, Reznik predicted the impact of technology and digitalization on the educational revolution. Reznik highlighted the digital fluency - the revision of teachers and students about technology as two important issues of the digital learning revolution, emphasizing the use of digital technology by teachers and students in the teaching process.

Since the advent of the Internet, the use of ICT in higher education has been expanding, but the level of its use varies from one context to another. Numerous studies suggest that digital technology not only meets the changing needs of higher education students, but it also improves learning and shapes digital culture (Alzahrani & Seth, 2021; Becker, 2017; Du Toit & Verhoef) , 2018; Lai, 2011; Laudari and Maher, 2019; Underwood, 2009; Vaghid and Vaghid, 2016). For example, Lai (2011) and Underwood (2009) point out that technology is used to varying degrees in all higher education institutions to support traditional, distance, mixed forms of learning.

It emphasizes that technology is used to varying degrees in all higher education institutions to support traditional forms of teaching. Similarly, Becker (2017) and Waghid and Waghid (2016) confirm that flexi-learning, e-learning and blended-learning have now become the norm and alternative to traditional teaching and learning in higher education.

Although digital technologies such as the use of digital artifacts, web resources and platforms have been in place for some time, its application in higher education and its impact on education remains largely unexplored.

Ga Lai (2011) points out that little information has been studied about how university teachers use digital technology in teaching and learning and how it is integrated into pedagogy, and its

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

potential impact on students (Mohammadi et al. (2021)) . Digital innovation and technology are often described as transformative and disruptive [Serdyukov 2017]. To move beyond the superficial integration of technology, researchers and practitioners are calling for students to organize education in a technology-based environment, supporting new student-oriented and pedagogically based learning paradigms [Lai 2011; Serdyukov 2017].

In other words, because technology is central, we need to determine that digital technology is associated with "the ability to support a more interactive and communicative process" [Lai 2011] p. 1269, which is indeed the case. "pedagogically, psychologically and socially meaningful and effective" [Serdyukov 2017] p.15.

The easiest element is to explain that students are well versed in digital elements and how this can improve the quality of their work. Lai (2011) suggests the use of digital technologies in response to these changes. When digital technology is used as a communication tool to support the construction and acquisition of knowledge, it can improve the quality of the learning experience. In terms of creativity, our findings support the study of Lai (2011) and Mynbayeva et al. (2017) emphasizes this creativity as a method of learning in the twenty-first century. Lai (2011) suggests combining formal and non-formal education to nurture creative and innovative cadres through the use of digital technologies in teaching and learning cultural practices.

Most digital teacher training programs in developing countries do not have a solid theoretical basis (Ottoman, 2010). Therefore, pedagogical methods should be included in ICT curricula to achieve the expected results (Lay, 2011). In order to achieve learning outcomes, it is important to adapt quality methods of teaching and teacher training to international quality standards.

According to MOE (2009), the ICT curriculum was released by the NIE and some institutions started ICT in the 2009 academic year as a subject for GCE (A / L). The quality of any ICT program depends on infrastructure facilities, computers and related equipment, qualified, pedagogical information, experience and skills of teachers, well-designed and constantly updated curricula, teachers, administrative bodies and student attitudes depend on good maintenance and monitoring (Lai, 2011). These analyzes and studies will determine how the above factors contribute to achieving quality education in ICT. In this regard, a number of barriers have been identified as to why the use of information and communication technologies (ICT) in teaching and learning in some higher education institutions is not significantly affected. University teachers 'lack of understanding of why and how technology should be incorporated into pedagogy has been acknowledged as one of the main reasons, and lack of professional development opportunities has often been cited as the reason for this lack of understanding. As a result, higher education institutions need to be more efficient, have more transparent responsibilities, and excel in both teaching and research. In an educational environment, this integration should be continuous and smooth, regardless of their type (tablet, smartboard, mobile device, etc.) focusing on devices. This is very important to contribute to the learning and development of students (Lai, 2011). While technology has provided opportunities to differentiate education, engage and address different students, its use as an architecture for predicting students 'learning needs and developing individual curricula is limited. Teachers and students Even in this digital age, globalization, internationalization, and the need for all traditional education have led to a shift in the priorities of education systems, both in the teaching and learning process and in technology. requires more flexibility in use (Lai, 2011). The inter-nationalization of students, the need for intensive pedagogical support, the integration of teaching technology, and the ability to access information from anywhere at any time have increased the demand for new roles and competencies among academics.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Influences the formation of community commitment and ensuring that students progress progressively through different stages of research (Garrison and Vogan, 2008). That is, community-based surveys provide an opportunity to combine physical and online learning spaces to build knowledge and develop a meaningful and dynamic exchange of experiences between student cohorts. In this way, students can be more willing to increase their interest and share knowledge.

In recent decades, the abundance of information and its dissemination through the network and other electronic means has led to the activation of educational programs, which has made the task of teachers more complex and arduous (Para Skevopoulou-Kollia 2006). In a society that has undergone many changes and is specific to an industry-based network (Castells 2010; Riele and Crump 2003), teaching in a variety of settings from institutions to universities has led to many structural changes in daily interactions with students. encountered, students prefer social networks to communicate even for institutional or departmental needs (Greenhow et al. 2009; Márquez-Ramos and Mourelle 2018).

REFERENCES:

1. Mamatov D.N, Bekchanova Sh.B, Xo‘jaev A.A. Elektron platforma tizimi va undan foydalanishni o`rganish. Metodik qo‘llanma. – Toshkent, 2020. B.35.

2. Соколова Н.А. Цифровая культура или культура в цифровую эпоху? Международный журнал исследований культуры. 2012; № 3 (8): 6 – 9.

3. Сергеева И.Л. Трансформация массовой культуры в цифровой среде. Культура и цивилизация. 2016; Т. 6, № 6: 55 – 65.

4. Галкин Д.В. Digital Culture: методологические вопросы исследования культурной динамики от цифровых автоматов до техно-био-тварей. Международный журнал исследований культуры. 2012; № 3: 11 – 12.

5. Петров А.А. Цифровизация экономики: проблемы, вызовы, риски. Торговая политика. 2018; № 3 (15): 9 – 31.

6. Загарских Е.Ю., Загарских Ю.А. Применение кибербезопасности и использование искусственного интеллекта в медицине. Системный анализ в проектировании и управлении. 2019:425 – 429.

7. Mamatov D.N., Bekchanova Sh.B., Saidova B.N., Abdullaeva D.N., Fayzieva G.U. Enhancing the participation of students and faculty in distance learning using blender learning and flipped classroom technologies in the development of pedagogy through digital technology // PSYCHOLOGY AND EDUCATION (2021) 58(2): 4910-4917. Америка. P 4910-4917.

8. Минасян Н.А. ИКТ как средство повышения мотивации учащихся на уроках иностранного языка. Научно-методический электронный журнал «Концепт». 2017; № S8: 34 – 38. Available at: http://e-koncept.ru/2017/470104.htm

9. Ильясов Д.Ф., Селиванова Е.А. Популяризация научных психолого-педагогических знаний среди педагогов общеобразовательных организаций с использованием метода кинопедагогики. Научное обеспечение системы повышения квалификации кадров. 2018; № 2 (35): 5 – 15.

10. Гнатышина Е.В., Саламатов А.А. Цифровизация и формирование цифровой культуры: социальные и образовательные аспекты. Вестник Челябинского государственного педагогического университета. 2017; № 8: 19 – 24.

11. Maxmudov A.Z., Bakalavr talabalarining raqamli madaniyati asosida raqobatbardoshlik sifatining afzalliklari. NamDU ilmiy axborotnomasi. 2021; №11:418-423.

12. Maxmudov A.Z., Raqamli jamiyat va raqamli madaniyat. NamDU ilmiy axborotnomasi. 2021; №12:549-552.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

APPLICATIONS OF CORRELATION AND REGRESSION ANALYSIS TO PRACTICAL PROBLEMS

Karimova Shalola Musayevna

Namangan Engineering Construction Institute

Republic of Uzbekistan, Namanagan city, 12 Islam karimov street.

Qirgizboev Umidjon

Student Namangan Engineering Construction Institute

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Abstract: *This article presents ideas and comments on the application of correlation and regression analysis to practical issues.*

Keywords: *Correlation, regression, equation, comparison, least squares method, coefficient.*

The effectiveness of correlation and regression analysis plays an important role in solving many economic and social problems. Prior to correlation and regression analysis, the relationship between the studied phenomena should be carefully analyzed in detail. If there is indeed a link, it will be possible to use the method of correlation and regression analysis as well as to obtain results of real significance.

The cumulative correlation analysis examines the single effect effect of a series of processes. The conditions for cumulative correlation analysis are the same as for correlation analysis. Typically, cumulative correlation is analyzed in direct contact with cumulative regression analysis. The cumulative regression equation can be constructed in the form of a simple scale, i.e. a variable included in the regression equations on a normal and normalized scale at the same rhythm, or as a variable expressed in a unit of comparison.

As a regression equation, it is often linear:

$$\hat{y} = a_0 + a_1 x_1 + a_2 x_2 + \ldots + + a_n x_n \qquad (1)$$

and level functions are used:

$$\hat{y} = a_0 x_1^{a_1} x_2^{a_2} \ldots x_n^{a_n} . \qquad (2)$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

The parameters of this equation are usually determined by the least squares method. In general, the system of normal equations is expressed as follows:

$$\begin{cases} na_0 + a_1\sum x_1 + a_2\sum x_2 + ... + a_n\sum x_n = \sum y \\ a_0\sum x_1 + a_1\sum x_1^2 + a_2\sum x_1x_2 + ... + a_n\sum x_1x_n = \sum x_1y \\ ..... \\ a_0\sum x_n + a_1\sum x_1x_n + a_2\sum x_2x_n + ... + a_n\sum x_n^2 = \sum x_ny \end{cases} \quad (3)$$

To determine the parameters of the model levels, we must first convert the model (2) to a logarithmic-linear view:

$$\ln\hat{y} = \ln a_0 + a_1\ln x_1 + a_2\ln x_2 + ... + a_n\ln x_n \quad (4)$$

We then use logarithms to construct a system of normal equations.

$$\begin{cases} n\ln a_0 + a_1\sum\ln x_1 + a_2\sum\ln x_2 + ... + a_n\sum\ln x_n = \sum\ln y \\ a_0\sum\ln x_1 + a_1\sum\ln x_1^2 + a_2\sum\ln x_1\ln x_2 + ... + a_n\sum\ln x_1\ln x_n = \sum\ln x_1\ln y \\ ..... \\ a_0\sum\ln x_n + a_1\sum\ln x_1\ln x_n + a_2\sum\ln x_2\ln x_n + ... + a_n\sum\ln x_n^2 = \sum\ln x_n\ln y \end{cases} \quad (5)$$

The bond density is similar to the correlation index and is estimated using the cumulative correlation coefficient:

$$R_{yx_j} = \sqrt{1 - \frac{\sum\left(y - \hat{y}\right)^2}{\sum\left(y - \bar{y}\right)^2}}, \quad (6)$$

here, $\hat{y}$ - theoretical value of the resultant indicator determined using the regression equation;

$\bar{y}$ - the arithmetic mean of the resultant value.

The less the resultant value deviates from the cumulative regression line, the greater the value of the correlation coefficient, which is significant in absolute value over a given interval. The cumulative correlation coefficient varies in the following range:

$$0 \le |R| \le 1.$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Once the main indicators of the correlation-regression analysis are known, the predictive indicators are determined: $\hat{y} = a_0 + b_0 t$; $\hat{x}_1 = a_1 + b_1 t$;....; $\hat{x}_n = a_n + b_n t$

a_0, b_0, a_1, b_1,..., a_n, b_n the least squares method is used to calculate the coefficients. Once the value is known, the deviation of the current variable values from the corresponding initial values is calculated:

$$\varepsilon_{y_t} = y_t - \hat{y}_t ; \quad \varepsilon_{x_1 t} = x_{1t} - \hat{x}_{1t} ;...; \quad \varepsilon_{x_n t} = x_{nt} - \hat{x}_{nt}$$

and then proceed to the regression analysis of the value, ε_y, ε_{x_1},..., ε_{x_n}.

Thus, to derive a linear trend from connected and unbound variables at the same time t the cumulative regression equation should be included in the time fund. In this case, the equation is expressed as follows:

$$\hat{y} = a_0 + \sum_{i=1}^{k} a_i x_i + a_{k-1} t . \qquad (7)$$

If the development trend of events is of a nonlinear nature, in such cases the difference of the highest order is determined or the most complex trend form is excluded:

$$\varepsilon = \frac{1}{l} \sum_{l=1}^{n} \left| \frac{y_i - \hat{y}}{y_i} \right| \cdot 100\% \qquad (8)$$

The average error of the prediction calculated in the formula can serve as an important issue in prediction - the criterion of accuracy in increasing the accuracy of calculations. Here y - the current level of the time series of the predicted time series level; l - forecast period.

The accuracy of the period depends on the past event and the duration of the predicted period.

As a mathematical model, we consider a conditional example of an enterprise.

Through the analysis, we make the following definitions $x_1^{(i)}$ - production volume at current prices, $x_2^{(i)}$ - flour production capacity, $x_3^{(i)}$ - mixed feed production, $x_4^{(i)}$ - bran preparation, Y – let the net profit of the enterprise.

Mathematical model view

$$Y = a_0 + a_1 \ln x_1^{(i)} + a_2 \ln x_2^{(i)} + a_3 \ln x_3^{(i)} + a_4 \ln x_4^{(i)} \quad (9)$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

look in the view.

In particular, we create economic factors that affect the net profit of enterprises and methods of their assessment. By calculating the coefficients of the system of normal equations in the form (5), and then solving the system of equations, the net profit of enterprises

$$Y = 58{,}4 \cdot \ln x_1 + 47{,}6 \cdot \ln x_2 + 11{,}11 \cdot \ln x_3 - 19{,}135 \cdot \ln x_4 - 242{,}253$$

can be calculated by the formula. The mathematical models analyzed are significant with a probability of 0.95 according to Fisher statistics.

References:

1. Ismoilov A.A, O.Q. Rixsimboev. Mathematical methods of economic analysis and forecasting. –T .: TDIU, 2007. -335 p.

2. Zamkov O.O. Mathematical methods and models. – M.: DiS, 2005.

3. M.O.Gafurov, K.Kholmurodov Economic mathematical methods and models. Tashkent, 2000.

4. Kremer N.Sh., Putko B.A. Econometrics. – M.: UNITI-DANA, 2002.

5. Musayevna, K. S. (2021). Find A General Solution of an Equation of the Hyperbolic Type with A Second-Order Singular Coefficient and Solve the Cauchy Problem Posed for This Equation. International Journal of Progressive Sciences and Technologies, 25(1), 80-82.

6. Akhmadjon o‘g‘li, H. A., Musayevna, K. S., & Abduvaxobovich, E. D. (2021). Evasion Problem for Movements with Acceleration On Constraint of Granwoll Type. International Journal of Progressive Sciences and Technologies, 24(2), 108-113.

7. Karimova, S. M. (2019). FIXED POINTS OF WHEN LINEAR OPERATORS MAPS. Scientific Bulletin of Namangan State University, 1(10), 62-65

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

INTEGRATION OF MATHEMATICAL AND PHYSICAL KNOWLEDGE IN THE TEACHING OF HIGHER MATHEMATICS

Karimova Shalola Musayevna
Namangan Engineering Construction Institute
Republic of Uzbekistan, Namanagan city, 12 Islam karimov street.

Valijonova Khusnobod
Student Namangan Engineering Construction Institute

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

One of the important factors in improving the quality of personnel is the integration of mathematical knowledge with knowledge of physics, chemistry and other natural sciences in the teaching of higher mathematics in higher education institutions trained by engineers, pedagogical educators, technologists, economists. When a new concept or theoretical knowledge is given from higher mathematics, it is important to apply the knowledge in the sciences in order to give examples or demonstrate how to apply their application. For example, if the concept of function is introduced, if R_t time axis R_x take that as the space axis

$R^2 = R_t \times R_x$, $f: R^2 \to R^2$ reflection $\begin{cases} x' = x - vt \\ t' = t \end{cases}$ with formula

when given (x, t) other than the inertial coordinate system (x', t') representing the classical substitution of Galileo for the transition to the system

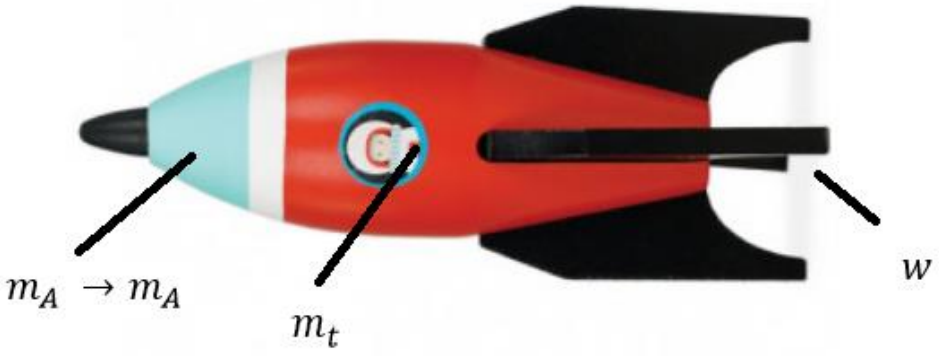
$$I: R^2 \to R^2, \quad x' = \frac{x - vt}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}, \qquad t' = \frac{t - \left(\frac{v}{c^2}\right)x}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}$$

and the relation is expedient to express the one-dimensional Lorentz substitution, which plays an important role in the theory of special relativity.

The citation of Tsialkovsky's formula in the application of differential calculus can be a shining example of the integration of mathematical and physical knowledge.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Consider a rocket moving away from a gravitational mass moving in a straight line in open



space.

M(t) t- Let the mass of the fuel rocket in the moment. v(t) his t– momentum speed, W– the velocity of the fuel burning from the rocket nozzle relative to the rocket. In this case, if we consider this system as a closed system -

momentum impulse $M\ (t) \cdot\ v(t)$ is equal to. $t +\ h$ – the momentum of the rocket with the remaining fuel M $(t + h) \cdot\ v(t + h)$ and the mass that has been discarded so far

$$|\Delta M|\ =\ |M\ (t\ + h) —\ M\ (t)\ |\ =\ -(M(t\ + h)—\ \mathrm{M}(t)$$

ΔI impulse $(v(t) —\ w)\ |\Delta M|\ <\ \Delta I\ <\ (v(t\ + h) —\ w)\ |\Delta M|$ will be in the range, ie $\Delta I\ =\ (v(t)—\ w)|\Delta M|\ +\ \alpha(h)|\Delta M|\ \ v(t)$ from the continuity of $h \to 0$ yes $\alpha(h) \to 0$ arises. Of the system t and $t\ + h$ simplifying by equating the momentum pulses

$\mathrm{M}(t\ + h)(v(t\ + h) —\ v(t))\ =\ -w(M(t\ + h) —\ \mathrm{M}(t))\ +\ \alpha(h)(M(t\ + h) —\ \mathrm{M}(t)$

we will have Let's do this as h to the limit $M\ (t)\ .v'\ (t)\ =\ -wM'(t)$ we will have From this $v'(t)\ =\ (-wIn\ M)'\ \cdot\ (t)\ ,\ v(t)\ =\ -wIn\ M(t)\ +\ \mathrm{c}$

Agar $v(0) = v_0$ if $c\ =\ v_0\ +\ wIn\ M\ (0)$ will be. From this $v(t)\ =\ v_0 + w\ \ln\frac{M(0)}{M(t)}$ we come to. This is the Tsialkovsky formula.

Thus, the integration of disciplines in Higher Mathematics classes deepens the concepts in the integrated discipline

to understand, plays an important role in applying them to life.

References:

1. Musayevna, K. S. (2021). Find A General Solution of an Equation of the Hyperbolic Type with A Second-Order Singular Coefficient and Solve the Cauchy Problem Posed for This Equation. International Journal of Progressive Sciences and Technologies, 25(1), 80-82.

2. Akhmadjon o‘g‘li, H. A., Musayevna, K. S., & Abduvaxobovich, E. D. (2021). Evasion

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

Problem for Movements with Acceleration On Constraint of Granwoll Type. International Journal of Progressive Sciences and Technologies, 24(2), 108-113.

3. Karimova, S. M. (2019). FIXED POINTS OF WHEN LINEAR OPERATORS MAPS. Scientific Bulletin of Namangan State University, 1(10), 62-65

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

ISSN: 2349-7793 Impact Factor: 6.876., Volume: 16 Issue: 02 in February 2022

APPLICATION OF REACTIVE POWER COMPENSATION METHODS IN ELECTRIC MOTORS

Nurov Homid Ibrahimovich
Senior Lecturer, Department of "Energy Supply in Agriculture and Water Management", TIIAME NRU Bukhara INRM.
Amrullayev Behzod Boburivich
TIIAME NRU Bukhara INRM Student of energy supply in agriculture and water management

Article history:
Received: 14 th February., 2022
Accepted: 16 th February., 2022
Published: 18 th February., 2022

Annotation*: In this article, we provide information on how to calculate the power losses of asynchronous electric motors and how to save them, ie reactive power compensation.*

Keywords*: engine, motor, jet, rectifier, coefficient.*

Reactive value compensation and $\cos\varphi$ increase are also important for all manufacturing sectors. The low power factor is due to the following reasons:

1. Incorrect selection of asynchronous motors in terms of power and operating conditions. Due to the high scattering of inductive resistance of phase rotor induction motors, the value of $\cos\varphi$ is lower than that of induction motors with short-circuited rotors. Cooling conditions in closed engines are lower than in open engines. Among motors of the same type and power, the higher the speed of one of them, the higher the value of $\cos\varphi$.
2. Incomplete and uneven loading of production mechanisms and their electrical equipment.
3. Unloaded operation of electric motors and transformers.
4. Use of high-power electric motors and transformers in low-power production facilities.
5. The use of electric motors at a power higher than the rated power increases the scattering of the magnetic flux, resulting in a decrease in $\cos\varphi$.
6. Use of faulty or badly repaired electrical equipment: for example, do not tightly compress the rotor steel cans, the number of coils of the Tatar coil is less than the initial number, etc. A 10% reduction in the number of wheels increases the engine speed by 25%, which leads to a decrease in power factor by 6-8%. A difference of 10 mm in the size of the rotor steel leads to a reduction of $\cos\varphi$ 15-30%
7. During lunch, evening shifts, when high-power machines are turned off for a long time and when operating in low load mode, a few volts increase in mains voltage leads to an increase in inductive consumer magnetic current and, consequently, a decrease in ladi. This is due to the fact that high-inductance consumers, such as welding machines, are used without reactive power compensators.

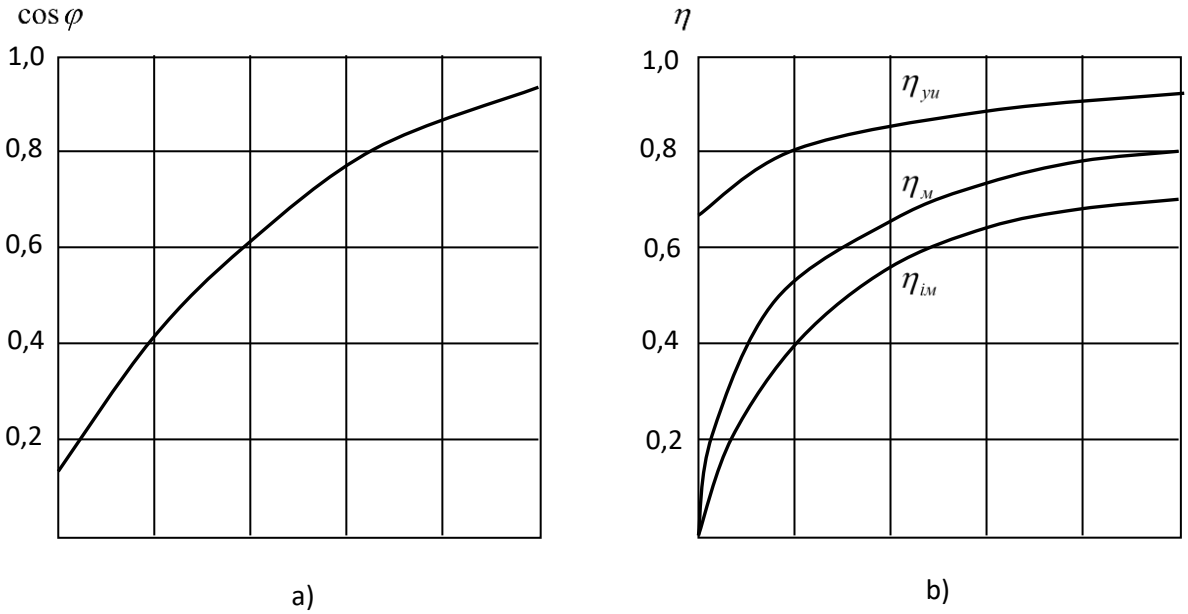
ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

8. As a result of the presence of rectifiers and the presence of ferromagnetic core power consumers operating in the mode close to the saturation mode, the sinusoidality of the voltage in the network is violated. In asynchronous motors and transformers, an additional power drop occurs under the influence of nosinusoidal voltage, which reduces the service life of the insulation.

$$K_M = \cos\varphi_1 K_{П1}, \qquad (1.1)$$

here $\cos\varphi$ is the power coefficient of the first harmonic

$K_П = \frac{I_1}{\sqrt{\Sigma I_i^2}}$ - correction factor; i is the harmonic organizer order number.



Graph 1. Graphs of dependence of asynchronous electric motor power factor (a), load factor $\eta_{iм}$, of electric motor $\eta_м$, working η_{yu} FICs (b)

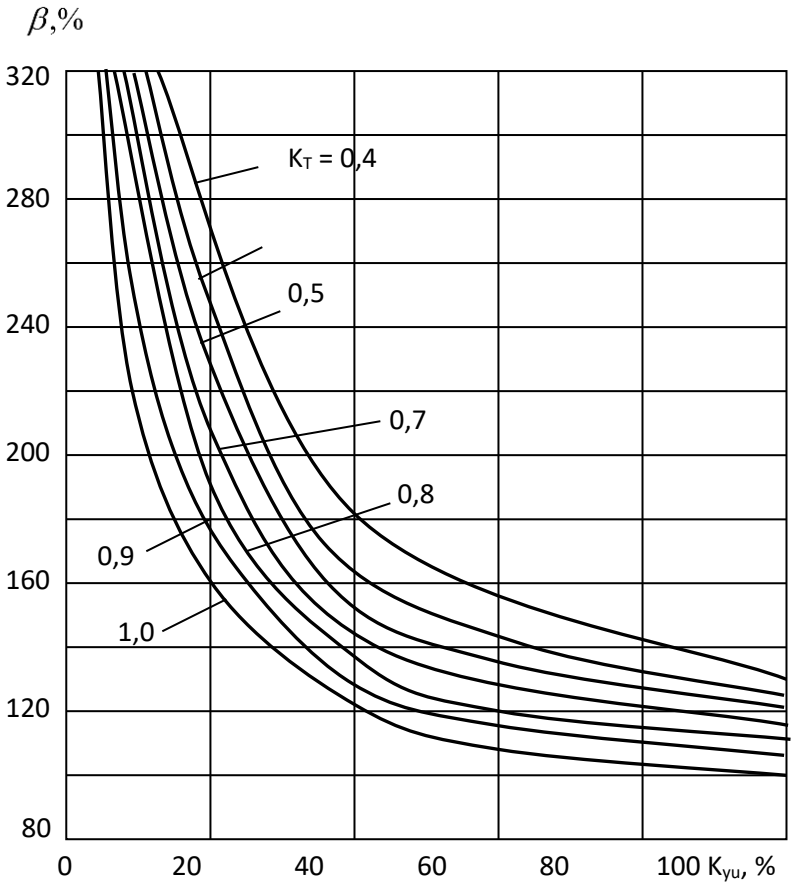
The following formula reduces the percentage of total power of the device
determined by:

The power factor used in industrial enterprises ranges from 0.2 to 0.5 (welding equipment, cranes, excavators) from 0.7 to 0.8 (fans, concrete mixers, conveyors), while the power factor is close to one. There may be consumers with dead and capacitive loads (synchronous motor compressors and pumps). However, according to the rules of operation of electrical equipment, the value of the power factor of the network should be 0.92 - 0.95.

In order to increase the power factor and reduce power losses in electrical equipment, the following measures are taken:

1. Selection of asynchronous motors with short-circuited rotors and the use of open-circuit motors that are easy to cool, depending on the capabilities and conditions.

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS



Graph 2. Graph of the specific value of electricity consumed in the working machine depending on the load factor

2. Achieving a uniform distribution of the working mechanism during the full loading and production of electrical equipment. Figure 2.2 shows the change in the load factor of the engine $\cos\varphi$ and the FIC, the working mechanism and the drive FIC depending on Kyu.

Electricity to calculate economized electricity we first calculate the specific value of energy:

$$Э_{CQ} = \frac{1}{\eta_M * \kappa_{yu}} \left[\kappa_{yu} + \frac{\alpha(1-\eta_M)}{\kappa_T} \right] \qquad (1.2)$$

Here $\eta_M -$ FIC when the working mechanism is fully loaded; Kyu - load factor; CT - coefficient of utilization of the working mechanism; $\alpha = 0,7 - 0,9 -$ coefficient depending on the type and design of the working mechanism.

Kyu and Kt coefficients are determined using the following formulas:

$$K_{yu} = \frac{P}{P_H}, K_T = \frac{t_M}{(t_M + t_O)} , \qquad (1.3)$$

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

here Pn is the rated power of the motor, tm is the operating time of the mechanism, and t_0 is the travel time.

Since to = 0 and Kt = 1, Kyu = 1 for the maximum operating mode of the working mechanism, the specific value of electricity is the minimum:

$$Э_O = \frac{[1+\alpha(1-\eta_M)]}{\eta_M} . \quad (1.4)$$

To calculate the energy savings as a result of increasing the load on the working mechanism, the hourly electricity savings are calculated by the following formula, taking into account the graphs in Graph 2.3 and $\beta = Э_{CQ} / Э_0$ the coefficient:

$$\Delta Э = (\beta_1 - \beta_2) * Э_O, \quad (1.5)$$

Here $\beta_1, \beta_2 -$ electricity is applied before and after loading coefficients of relative change of specific energy.

List of used literature:

1. DESCRIPTION OF DEFECTS IN ASYCHRONIC MOTORS //S.D Turaev, B.B. Amrullaev, Sh. Kamilov, A.A.O. Boybekov
// Scientific progress 2 (7), 1310-1314
https://cyberleninka.ru/article/n/asinhron-motorlarda-yuzaga-keleki-nu-sonlar-tavsifi/viewer.

2. Vol. 1 No. 6 (2021): Journal of Ethics and Diversity in International Communication "Energy Saving with Two-Speed Motors in Pumping Stations" F. N. Toychiev, H. J. Achilov, H. N. Mamadiev, Zh. B. Razhabov http://openaccessjournals.eu/index.php/jedic/article/view/751/715

3. METHODS OF DEVELOPMENT OF MICROCANTIROLER CONTROL SYSTEM FOR COMPENSATION OF REACTIVE POWER, SCIENCE AND EDUKATION // scientific journal 2020 ISSN 2181-0842, Mamliev B., Amuliev B.O.
https://cyberleninka.ru/article/n/reactive-power-compensation-for-microcontroller-control-system-development-methods,

4. International Journal of Discoveries and Innovations in Applied Sciences Characteristics of Teaching the Subject of Electricity Supply on the Basis of Interactive Methods Mirzaev Sanjar, Amrullaev Behzod, Mehmonkulov Shoraxmat, Asrorov Shahboz
http://openaccessjournals.eu/index.php/ijdias/article/view/958

ISSN 2349-7793 (online), Published by INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT, ENGINEERING AND SOCIAL SCIENCES.,
under Volume: 16 Issue: 02 in February-2022
https://www.gejournal.net/index.php/IJRCIESS

TOGETHER WE REACH THE GOAL