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ZAMONAVIY INTENSIV OLMA BOG‘LAR UCHUN PAST BO‘YLI PAYVANDTAGLARDA KO‘CHATINI YETISHTIRISH TEXNOLOGIYASI

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ANNOTATSIYA

Vegetativ payvandtaglarni qalamchalaridan ko‘paytirish payvandtaglarning novdasini pastki qismidan olingan qalamchalarning tutuvchanligi barcha sinalgan payvandtaglarda yetarlicha qoniqarlidir. Tanlangan payvandtaglar orasida MM102 da eng yuqori ko‘rsatkich – 3 yilda o‘rtacha 40,7%, M9 da esa eng past – 21,4% bo‘ldi.

Vegetativ payvandtaglarni qalamchasidan ko‘paytirish ko‘chatchilik bilan shug‘ullanuvchi fermer hamda tomorqa xo‘jaliklari uchun yaxshi samara beradi va sifatli olma ko‘chatlarini tayyorlanadi.

Kalit so‘zlar: Bog‘payvandtag, payvandust, qalamcha, substrat, navlar, olma, ko‘chat, daraxt, kurtak payvand, ko‘chatzor, ildiz, tuproq, agrotexnika.

TECHNOLOGY OF GROWING SEEDLINGS ON LOW HEIGHT ROOTS FOR MODERN INTENSIVE APPLE ORCHARDS

ABSTRACT

The article outlines the tasks of developing a technology for growing apple seedlings attached to low-growing wings that grow vegetatively for intensive gardens based on advanced technologies in the field of fruit.

It is possible to show Korey and local Nafis varieties, which are connected to the low-fat M9 limestone, which is based on late winter varieties of winter crops and their cold-frost resistance against the standard grade.

Keywords: Garden, grafting, grafting, cuttings, substrate, varieties, apple, seedling, tree, bud grafting, nursery, root, soil, agrotechnics.

KIRISH

Hukumatimiz tomonidan ko‘zda tutilgan respublika aholisi uchun meva yetishtirish hajmini oshirish, jadal tipdagi bog‘ maydonlarini kengaytirishni talab etadi, bu esa mevali o‘simliklar

ko‘chatlarini ko‘p miqdorda yetishtirib berish bilan uzviy bog‘liqdir.

Mevali o‘simliklari ko‘chatlarini yetishtirishda payvandtagni to‘g‘ri tanlash ko‘p jihatdan ko‘chatchilikning rivojlanish muvaffaqiyatini belgilab beradi. Ko‘p yillik amaliy tajribalar va tadqiqot natijalari shuni ko‘rsatadiki, barpo etilayotgan bog‘larning yuqori hosildorligi, qishga chidamliligi va uzoq umr ko‘rishi, mazkur meva o‘simligi ko‘chatlari ularga aynan mos bo‘lgan payvandtagda yetishtirilgandagina ta’minlanadi.

Payvandtagning payvando‘stga ta’siri ko‘p tomonli bo‘lib, u o‘simlikning butun hayoti mobaynida yuzaga chiqadi. Payvandtagga qo‘yiladigan biologik va xo‘jalik xarakteridagi talablar aynan shu bilan belgilanadi.

O‘zbekiston bog‘lari uchun shunday payvandtaglar zarurki, ular bog‘ barpo etiladigan sharoitlarga yaxshi moslashishi, payvando‘st navlar bilan fiziologik jihatdan yaxshi mos kelishi, ular bilan mustahkam birikib ketishi, sovuqqa chidamli, kasallik va zararkunandalarga nisbatan immun bo‘lishi, mevali daraxtlarning uzoq yashashi, va yuqori hosildorligini ta’minlashi lozim.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Internet tizimidagi http://ej.kubagro.ru [8] saytda aytilishicha, o‘simliklarning vegetativ yo‘l bilan ko‘payishi – bu, onalik qismidan yangi organizmning hosil bo‘lishidir. Tabiatda kuzatiladigan vegetativ ko‘payish usullari xilma-xildir. Bularning eng oddiysi – bitta vegetativ hujayradan, uning muntazam bo‘linishi va hosil bo‘lgan hujayralarning differensiatsiyasi natijaida organizmning tiklanishidir.

D.S. Izbasarov va K.G. Karichevlarning [3] ishlarida mevali ekinlarning ekish materialini yog‘ochlashgan poya qalamchalaridan yetishtirish bo‘yicha tadqiqotlar keltiriladi. Bunday qalamchalarni vegetativ yo‘l bilan ko‘payuvchi payvandtaglarning ona ko‘chatzorlarida tayyorlash mumkin. Tadqiqotlarda aniqlanishicha, Qozog‘istonning janubiy va janubiy-sharqiy iqlim sharoitlarida mazkur usul uta maqbuldir. U ko‘chatzordan ko‘chatlarning chiqishini bir yilga tezlashtirish, ekish materialini yetishtirish bo‘yicha xarajatlarni qisqartirish, klon payvandtaglarida ko‘chat ko‘paytirish koeffitsientini oshirishga imkon beradi.

Oryol shahridagi mevali ekinlar seleksiyasi ITI olimlari Ye. Sedov, N. Krasova, Z. Serovalarning [7] ta’kidlashicha, kuchsiz o‘suvchi daraxtlarni faqatgina ildiz otgan pakana yoki yarim pakana payvandtaglar qalamchalari yoki parxishlariga payvand qilib emas, balki kuchli o‘suvchi urug‘lik payvandtaglarga kuchsiz o‘suvchi payvandtagni 18-20 sm uzunlikda oraliq payvand qilib (interkalyar) ham olish mumkin.

Tajribalar “Mevachilik va uzumchilik” kafedrasida ishlab chiqilgan uslub bo‘yicha olib borildi. Dala tajribalari Toshkent

davlat agrar universitetning ilmiy tadqiqot va o‘quv-tajriba xo‘jalik stansiyasidagi ko‘chatzorda o‘tkazildi. Biometrik o‘lchovlar va hisoblar: har bir variantda 10 ta o‘simlikda olib borildi. Tajriba to‘rt qaytariqda o‘rganildi. Tajriba uchun olmani vegetativ yo‘l bilan ko‘payuvchi M9, M7, MM102, MM104, MM105, MM111, MM109 payvandtaglari olindi. Nazorat sifatida olmani “MM106” payvandtagi olindi.

Biokimyoviy va fiziologik tadqiqotlar I.V.Michurin nomidagi Rossiya bog‘dorchilik ilmiy-tadqiqot institutining “Mevali ekinlar navlarini sinash uslubi va dasturi”ga (1973) muvofiq o‘tkazildi. Tuproq, barg va mevalarning tahlili, tuproqning suv-fizik xususiyatlari paxtachilik ilmiy-tadqiqot institutida ishlab chiqilgan uslub (1977) bo‘yicha amalga oshirildi.

Tajriba ma’lumotlariga statistik ishlov berish B.A.Dospexov (1985) uslubi bo‘yicha dispersion tahlildan o‘tkazildi.

NATIJALAR

N.V. Govorushenkoning [2] tadqiqotlari navning biologik xususiyatlari, payvandtag sifati va qo‘llaniladigan texnologiya elementlariga bog‘liq ravishda kuchsiz payvandtaglarga payvand qilingan bir yillik olma ko‘chatlarini shoxlantirishga differensiatsiyalangan yondashuvni qo‘llash to‘g‘risida bilib olish imkonini beradi. Vegetativ yo‘l bilan ko‘payuvchi payvandtaglar onalik o‘simliklarini chopiq qilish uchun optimal organik substrat – sholi kepagi tanlangan.

Ko‘chatchilik amaliyotida kuchsiz o‘suvchi olma payvandtaglarini ko‘paytirishda onalik tuplarda novdalarning ko‘pchilik qismi (30% va undan ko‘proq) umuman ildiz hosil qilmaydi va buning oqibatida ular ekishga yaroqsiz hisoblanadi.

Kuchsiz o‘suvchi har xil tipdagi payvandtaglarning qalamchadan ko‘payishga qodirligini aniqlash uchun ildiz otmagan novdaning pastki qismidan, shuningdek, novdaning o‘rta qismidan qalamcha olib 2015-2017 yillarda maxsus tajriba o‘tkazdik.

Uzunligi 23-25 sm bo‘lgan qalamchalar bahorda (mart boshida) ko‘chatzorning birinchi dalasiga ekildi. Novdaning pastki qismidan olingan qalamchalar hech qanday tayyorgarchiliklarsiz o‘tqazildi, o‘rta qismdan olingan qalamchalar esa kuzdan boshlab oddiy xandaqlarda kilchevka qilindi. O‘tqazilgan qalamchalar yoz mobaynida 12-14 marta sug‘orildi.

Quyidagi 1-jadval ma’lumotlari ko‘rsatganidek, novdaning pastki qismidan olingan qalamchalarning tutuvchanligi barcha sinalgan payvandtaglarda yetarlicha qoniqarlidir. U MM102 da eng yuqori – 3 yilda o‘rtacha 40,7%, M9 da esa eng past – 21,4% bo‘ldi.

1-jadval

Kuchsiz o‘suvchi payvandtaglar qalamchalarining ildiz otuvchanligi
(o‘tqazilgan soniga nisbatan %, 2021-2023 yy.)

Payvandtag	Novdaning pastki qismidan olingan qalamchalar			Novdaning o‘rta qismidan olingan qalamchalar		
	2021	2022	2023	2021	2022	2023
M9	26,8	17,0	20,5	5,6	0,5	4,8
M7	40,5	29,4	40,9	25,4	12,7	18,7
MM102	36,0	38,5	47,8	27,0	23,6	37,8
MM104	45,7	31,0	40,3	13,5	18,1	32,5
MM105	37,4	22,0	27,1	20,2	11,3	19,6
MM111	38,2	25,6	36,5	23,2	12,6	25,3
MM109	35,0	33,8	32,1	30,2	22,5	33,5
MM106 (nazorat)	65,2	30,7	45,0	40,0	21,7	24,5

Shu bilan birga novdaning o‘rta qismidan olingan qalamchalarning tutuvchanligi hamma payvandtagda ham yetarlicha yuqori bo‘lmaydi – faqat MM104 da o‘rtacha 25,3%, M7 da 18,9 % va MM106 tipida – 28,7% bo‘ldi.

2021-2023 yillardagi issiq va sernam bahorda qalamchalarning tutuvchanligi sezilarli ortdi va aksincha 2017 yilgi sovuq yoki quruq bahor sharoitida u past bo‘ldi.

2-jadvalda keltirilgan ma’lumotlar shuni ko‘rsatadiki, Mamlakatimizning qulay tuproq-iqlim sharoitlarida ko‘chatzordagi tutgan qalamchalar (novdalarning ham pastki, ham o‘rta qismidan olingan) shu yilning o‘zida kurtak payvand qilishga yaroqli bo‘ldi.

Ildiz otgan parxishlar va urug‘ ko‘chatlarga nisbatan mazkur o‘simliklar ancha sust o‘sadi va ularning diametri kurtak payvand uchun yaroqli ko‘chatlarga qo‘yilgan standart talablariga javob beradi.

2-jadval

Ko‘chatzorning birinchi dalasida har xil payvandtaglarda ildiz otgan qalamchalarining rivojlanishi (2021-2023 yy)

Payvandtag	Parxishlar		Novdaning pastki qismidan olingan qalamchalar		Novdaning o‘rta qismidan olingan qalamchalar	
	Baland-ligi, sm	novda diametri, mm	baland-ligi, sm	novda diametri, mm	balandligi, sm	novda diametri, mm
M9	103	0,9	93	0,8	82	0,7

M7	70	0,6	67	0,6	51	0,5
MM102	86	0,7	80	0,7	62	0,6
MM104	94	0,9	91	0,7	82	0,7
MM105	62	0,8	55	0,7	46	0,6
MM111	74	0,9	68	0,8	62	0,7
MM109	95	0,9	86	0,8	77	0,7
MM106	109	0,8	99	0,8	83	0,6
Sivers olmasi (nazorat)	91	0,8	-	-	-	-

MUHOKAMA

Shunday qilib, respublikamiz sharoitlarida sinalgan barcha kuchsiz o‘suvchi payvandtaglarni faqatgina ildiz otgan parxishlar bilan emas, balki ildiz otmagan novdalarning pastki qismidan olingan qalamchalar bilan ham, ularni ko‘chatzorning birinchi dalasiga qalin ekib (qatorda 20-22 sm o‘rniga 8-10 sm), muvaffaqiyatli ko‘paytirish mumkin.

Bu vaqtda MM111, M7 va MM106 payvandtag tiplari novdasining o‘rta qismidan olingan qalamchalarning yaxshi ildiz otishi, ularni qo‘shimcha qalamcha bilan ko‘paytirish imkoniyati mavjudligini ko‘rsatadi.

Hozirgi vaqtda kuchsiz o‘suvchi payvandtaglarda olma ko‘chatlari yetishtirish uchun dastlabki materialning keskin tanqisligini hisobga olsak, ularni qalamchadan ko‘paytirish (ayniqsa kamyob M9 va M7 tiplarini) qo‘shimcha ekish materiali olish imkonini beradi.

XULOSA

Maqolada vegetativ payvandtaglarni qalamchalaridan ko‘paytirish bo‘yicha ma’lumotlar keltirilgan shu ma’lumotlarga asoslangan holda payvandtaglarning novdasini pastki qismidan olingan qalamchalarning tutuvchanligi barcha sinalgan payvandtaglarda yetarlicha qoniqarlidir. U MM102 da eng yuqori – 3 yilda o‘rtacha 40,7%, M9 da esa eng past – 21,4% bo‘ldi.

Vegetativ payvandtaglarni qalamchasidan ko‘paytirish ko‘chatchilik bilan shug‘ullanuvchi fermer hamda tomorqa xo‘jaliklari uchun yaxshi samara beradi va sifatli olma ko‘chatlarini tayyorlash imkoni tug‘iladi.

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KAMBAG‘ALLIKNING FALSAFIY VA IJTIMOIY ASOSLARI: TARIXIY TAHLIL

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ANNOTATSIYA

Maqolada kambag‘allik tushunchasi falsafiy va tarixiy nuqtai nazardan keng qamrovda o‘rganilgan. Tarixiy manbalar, mutafakkirlar qarashlari va nazariyalar asosida kambag‘allikning evolyutsiyasi hamda zamonaviy dunyoda bu muammoni hal qilishga bo‘lgan yondashuvlar tahlil qilinadi. Maqola orqali kambag‘allikning ijtimoiy, iqtisodiy va siyosiy jihatlariga oid fikrlar keng ko‘lamda yoritilgan, bu esa uning zamonaviy talqinlarini chuqurroq tushunishga yordam beradi.

Kalit so‘zlar: kambag‘allik, tarix, falsafa, iqtisodiyot, ijtimoiy tengsizlik, nazariyalar, evolyutsiya.

ABSTRACT

This article explores the concept of poverty from a philosophical and historical perspective. It examines the evolution of poverty through historical sources, philosophical views, and theoretical frameworks, analyzing approaches to address poverty in the modern world. The article provides a comprehensive discussion of the social, economic, and political aspects of poverty, contributing to a deeper understanding of its contemporary interpretations.

Keywords: poverty, history, philosophy, economics, social inequality, theories, evolution, Rawls, Aristotle.

KIRISH

“Kambag‘allik” iqtisodiy atama sifatida yaqin o‘tmishda fanga kirib kelgan bo‘lsada uning asl mohiyati va uning jamiyat hayotiga ta’siri qadim zamonlarda to shu kungacha ilmiy jamiyatlar orasida haligacha dolzarbligini yo‘qotgani yoq. Bugungi zamonaviy dunyoda ham ko‘plab munozaralarga sabab bolmoqda. Kambag‘allik haqida qadimgi ilmiy asarlarda, aksariyat hollarda kambag‘allik jamiyatga foyda keltirgan deb aytilgan. Kambag‘allik yoki unga chambarchas bog‘liq muammolar bo‘yicha dastlabki tadqiqotlar zamonaviy kambag‘allik boyicha izlanishlarning boshlang‘ich nuqtalar hisoblanadi. Bunga misol qilib psixalogiya soxasidagi Jan Luis Vivesning XVI asr

boshlarida yozgan asarlari, epedimaloqiya boyicha Doktor Jon Snouning vabo epidemiyasi sabablari bo‘yicha tadqiqotlarida (XIX asr boshlarida London), uy xo‘jaligi iqtisodiyoti: Ernst Engel kambag‘al va kambag‘al bo‘lmagan odamlarning sarf-xarajatlaridagi farqlarni o‘rganish (Germaniyada XIX asr o‘rtalarida), ijtimoiy fanlar: Charlz Booth 19-asr oxirida Londonda kambag‘allikni sinchkovlik bilan kuzatish tadqiqotlari, makroiqtisodiyot: Jon Meynard Keynsning 1930-yillar boshidagi “Buyuk Depressiya” davrida yuzaga kelgan ommaviy ishsizlik sabablarni tushunishga qaratilgan harakatlarida va albatta, yana ko‘plab misollarni mavjud. Kambag‘allik doir tatqiqotlarning katta qismi so‘nggi ikki yuz yil ichida unga qarshi siyosatning ma’naviy va iqtisodiy asoslarini yaratishda muhim rol o‘ynagan.

ADABIYOTLAR TAHLILI VA METODOLOGIYYA

Ilm va harakat o‘rtasidagi o‘zaro bog‘liqlik murakkab va ularning siyosat maydonida paydo bo‘lishi ko‘p narsalarga, jumladan texnologiyaga, jamoatchilik xabardorligiga va kuchlar muvozanatiga bog‘liq. Shunga qaramay, kambag‘allik haqidagi fikrlar qanday rivojlangani haqida o‘rganilishi kerak bo‘lgan voqealar bor. Bu bugunning asosiy munozaralarni tub ildizlari hisoblanadi. Ushbu bahslarning ba’zilari uzoq vaqtdan beri davom etib kelmoqda. Biroq qadimgi va zamonaviy dunyo insonlarning fikirlashlarida katta farqlar mavjud. Ushbu farqlarni o‘rganish bilim taraqqiyotni mustahkamlaydi va uni kengroq aks ettirishini ko‘rsatadi. Phd ishinig birinchi bop birinchi qismida kambag‘lik tushunchasing paydolishi tarixi va uning iqtisodiy ahamiyati yoritadi.

Tarixiy kelib chiqishi: Qadimgi dunyoda kambag‘allik dunyoviy ishlarga aloqador yani qonunlar, soliqlar va davlat xarajatlari masala sifatida ko‘rilmagan. Dastlabki tushunchalarga kora barcha narsa savob ishlarga ko‘ra mukofot sifatida qaralgan. Keyinchalik yunon faylasufi va olimi Aristotelning asarlarida ayniqsa “ Nikomax etikasi va siyosati” asarida . Faqat eng malakali insongina Davlat rahbari lavozimiga saylanishi kerak degan fikrlar miloddan avvalgi 350- yillarda paydo bo‘lgan. Bu fikir orqali Arisrtotel o‘zing davri uchun revalutsiyon fikrni ya‘ni boylik va hukumronlik o‘z navbatida kambag‘allik ham insonga u qilgan yaxshi yoki yomon ishlar uchun emas balki o‘zing salohiyati va qobilyatiga qarab berilishini takidlab o‘tgan. Aristotelning adolat tushunchasi jamiyat rivojiga juda katta ta’sir ko‘rsatdi. Bu ochiq-oydin erkin va intiluvchan o‘rta sinf (kambag‘al, lekin erkin odamlar) uchun jozibador edi va biroz umid uyg‘otivchi fikrlar edi. “Teng imkoniyatlar” g‘oyalari va barchaning “erkinlik” huquqlari g‘oyalarini Aristotel qattiyat bilan ilgari surgan bo‘lsada, biroq, Arestoteling bu tenglik g‘oyasi to‘liq tenglik emas edi. U qillikni maqullagan va buni adolatdan deb hisoblagan. Bunga misol Aristotel yozgan: “...tug‘ulgan saotdan

boshlab, bazi erkaklar uchun bo‘ysinish va boshqalari xukumron bolishini belgilash kerak. Qullarning borligi ham maqsadga muvofiqdir ham adolatdandir.”

Bu yerda Aristotel jamiyatdagi irarxiyalar uchun muhim dalillar keltirgan edi, ular ijtimoiy barqarorlik va samaradorlikning axloqiy jihatdan muhum maqsadlariga xizmat qildi. Agar Aristotel qullikni o‘z misoli sifatida ishlatmaganda, uning dalillari ko‘proq shakllangan bo‘lishi va zamonaviy dunyo uchun maqbul bolardi. Aristotel bu o‘rinda jamyatdagi qullar qatlami (o‘sha davrda qashshoqlar va undan ham pastgi qatlami) mavjud bolishi jamiyat va uning iqtisodiy taraqqiyoti uchun foydali deb bildi. Bu fikr quldorlik davri fiodal tizim va hatta sano‘at inqilobi davrida ham to‘gri g‘oya sifatida qaraldi biroq hozrgi davrda bu g‘oya o‘zining dolzarbligini to‘laligicha yoqotgan chunki Arestotel inson kapitali va uning yoqotilishini inobatga olmagan.

Miloddan avvalgi 500-yillarda Konfutsiy kambag‘allik yaxshi hukumat oldini olishda yordam berishi kerak bo‘lgan “oltita ofat” dan biri ekanligini takidlab o‘tgan (Boshqa besh balo: erta o‘lim, kasallik, baxtsizlik, jirkanch ko‘rinish, va zaiflik. Bundan tashqari, beshta ne’mat bor edi: boylik, uzoq umr, sog‘lik, yaxshi xulq va yoqimli tashqi ko‘rinish). Bu vaqtda G‘arbliklarning asosiy tashvishlari, boylik, tengsizlik bilan bog‘liq surunkali kambag‘allik emas edi balki, buning o‘rniga, asosiy tashvish uyg‘un ijtimoiy tuzum qurushda edi. Kanfutsiyning fikriga ko‘ra qachon odamlar to‘q bo‘lsa ehtiyojlarini malum miqdorini qondirishga imkon bo‘lsa va yetishmovchilik sabab boshqa joylarga ko‘chib ketishmasagina uyg‘un jamiyat qurush mumkun bo‘lgan. Uning fikriga ko‘ra bunday jamiat qurushga eng asosiy g‘ov yetishmochilik bo‘lgan. Kanfutsiyning g‘oyalari bir necha ming yillar oldin aytilgan bo‘lsada Aristotelning g‘oyalaridan farqli ravishda bugunki kunda ham o‘z dolzarbligini yo‘qotgani yoq.

NATIJALAR VA MUHKAMA

Keyingi davrdadagi kamabg‘allik haqidagi fikrlar shakillanishi islom dini yaralishi va tarqalishi davriga tog‘ri keldi. Islom intellektual an’analari butun musulmon olamida jamiyatlarning qadriyatlari va axloqiy tamoyillarini shakllantirishda yetakchi kuch bo‘lib xizmat qilgan. O‘rta Osiyoning qadimiy shaharlari, jumladan, Samarqand va Buxoroda islom ta’limotlarini yoyish, mehr-oqibat va ijtimoiy mas’uliyat madaniyatini yuksaltirishda alloma va mutafakkirlar muhim rol o‘ynagan. Islom dinining asosiy aqidalaridan biri sadaqa (zakot) va kam ta’minlanganlarga rahm-shafqat qilish tamoyilidir. Bu tamoyil ildizlarini Qur’on amrlari va Muhammad (s.a.v.) payg‘ambarning so‘zlaridan olinib, jamiyatdagi kambag‘allik va tengsizlikni bartaraf etish uchun axloqiy asos yaratgan. Qadimgi O‘zbekiston hududida yashagan olimlari islom ilmini chuqur o‘rganishgan, hamda, kambag‘allikni nafaqat

shaxsiy dard, balki jamoaviy jamiyat mas'uliyati sifatida ko'rib, bu tamoyillarni qo'llab-quvvatlashgan. Islomiy g'oyalarda kambag'allik dard deb qaralgan va mo'minlarni bir-birlariga yordam berishga chaqirilgan. Islomning besh arkonidan biri bo'lgan zakot muhtojlarga yordam berish va ijtimoiy farovonlikni saqlashga qaratilgan sadaqaning farz shaklidir. Bu haqda Qur'onda ko'p marta zikr qilingan, jumladan, Baqara (2:43) va Baqara (2:267) suralarida mo'minlar kambag'al va miskinlarga xayr-ehson qilishlari buyurilgan. Qadimgi movrounnaxr olimlari Qur'onning ushbu amrlarini yaxshi bilishgan va jamiyatdagi kambag'allikni bartaraf etish uchun zakot majburiyatlarini bajarish muhimligini ta'kidlagan. Shuningdek hadislarda ham hayriya masalasiga ko'p bor to'xtalib o'tishgan. Muhammad (s.a.v) payg'ambarning so'zlari va xatti-harakatlari sadaqaning ahamiyati haqida ko'proq yo'l-yo'riq beradi. Payg'ambarimiz Muhammad (s.a.v) "Sadaqa molni kamaytirmaydi" degan mashhur rivoyatlari kabi sadaqaning fazilatlarini ta'kidlaydigan ko'plab hadislar mavjud (Sahih Muslim). Islom dini g'oyalari va ular asosida yozilgan asarlar keyinchalik ham O'rta Osiyo hududida davlat boshqaruvida muhum ahamiyat kasb etdi. Jumladan: Temuriylar saltanatining qudratli hukmdori Amir Temur o'zining harbiy mahorati va ulkan zafarlari bilan shuhrat qozongan bo'lsada. Biroq, uning hukmronligini sinchiklab o'rganish yanada nozik manzarani ko'rsatadi. Amir Temur ham o'zining ulkan saltanatida kambag'alikni boshqarish haqidagi o'z g'oyalarni ilgari surgan. Uning o'ziga xos pozitsiyasini tavsiflovchi yagona, aniq matn mavjud bo'lmasa-da, biz tarixiy voqealar va uning davrida amalga oshirilgan iqtisodiy siyosatlardan ma'lum bir tushunchalarni olishimiz mumkin. Amir Temur o'z davridagi Yevropalik hukumdor va olimlarning fikriga teskari ravishda kambag'allikni jamiyat uchun zararli omil deb bilgan va o'z saltanatida unga qarshi kurashish uchun ko'lab iqtisodiy islohatalar amalga oshirgan bulardan: Amir Temurning iqtisodiy qarashlari tizimida soliq masalasi asosiy o'rinni egallaydi. Iqtisodiyot soliq tizimi orqali tashkil etilganligi va boshqarilganligi sababli mamlakatning iqtisodiy va harbiy hayoti tartibga solinadi. Tadbirkor o'zining soliq siyosatida ham xalq manfaati ustuvorligiga amal qiladi. U soliq tizimi orqali aholi qashshoqlashsa, buning natijasida davlat ham qashshoqlashadi, aholining boy yashashi uchun adolatli soliq tizimi zarur, deb hisoblagan. Shuningdek Amir Temur sarmoyasini yo'qotgan savdogarlarni moliyaviy qo'llab-quvvatlashni hamda, qiynalayotgan dehqonlarni yerga ishlov berishda davom etishini uchun urug' va texnika bilan ta'minlashni buyurgan. Bu orqali, ularning iqtisodiyotga hissa qo'shishda davom etishini ta'minlagan. Amir Temur o'limidan so'ng mamlakatda sodir bo'lgan tartibsizliklar mintaqada ilimga bo'lga qiziqishni yo'qolishiga sabab bo'ldi. Biroq Yevropada sodir bo'lgan renesans va uning oqibatida mamlakatlar iqtisodiyotidagi

kuzatilgan reformalar o‘z davrining olimlarini jamyatning farovonlik va kambag‘allik masalalarini chuqur tahlil qilishga undadi va katta bahslarga sabab bo‘ldi. Zamanaviy dunyoning kambag‘allikga doir qarashlarni shakillanish evalutsiyasini quyidagi ketmaktelikda tartibga solish va davrlarga ajratish mumkun. (Jadval 1).

Kambag‘allikda doir ahamiyatga ega ilmiy fikrlar va izlanishlar xranalogiyasi

№	Davr	Yillar	Asosiy shaxs va hodisalar	Sohaga qo‘shgan hissasi
1.	**Premodern ilmiy tadqiqotlar va dastlabki izlanishlar**			
1.1	Jean Luis Vives	16-asr boshlari	Shaharlarning kambag‘allarni qo'llab-quvvatlash majburiyatini targ'ib qilgan.	Ijtimoiy mas’uliyat haqidagi yozuvlari bo‘lgan eski qo‘lyozma va kitob.
1.2	Dr. John Snow	1813-1858	Uning va’boga oid tadqiqotlari orqali kambag‘al yashash sharoitlari va salomatlik ko‘rsatgichlari orasidagi bog‘liqlikni ko‘rsatgan.	Londondagi va’bo tarqalishini ko‘rsatadigan xarita.
1.3	Ernst Engel	1821-1896	Englening Qonuni, kambag‘al va kambag‘al bo'lmagan xonadonlarni ajratib turadigan miqdoriy o‘lchovni ishlab chiqqan.	Englening Qonunini ko‘rsatuvchi grafik (daromadning oziq-ovqatga sarflanadigan foizi va umumiy daromad).
2.	**Birinchi Kambag'allik Yoritilishi (19-asr)**			

2.1	Sanoat inqilobi	1760-1840	Sanoatlashtirishning shahar kambag‘alliklariga salbiy ta’sirini ko‘rsatgan.	
2.2	Charles Booth	1840-1916	Londondagi yashash sharoitlari haqida batafsil empirik ma’lumotlarni taqdim qilgan.	Londondagi kambag‘allik darajalariga qarab ranglangan hududlarni ko‘rsatadigan xarita.
2.3	John Maynard Keynes	1883-1946	Buyuk Depressiya davrida ommaviy ishsizlik va kambag‘allikka qarshi kurashish uchun davlat aralashuvini targ‘ib qilgan.	Iqtisodiyotni jamoat ishlari va bandlik dasturlariga e’tibor qaratgan holda tasvirlash.
3.	**Erta zamonaviy davr kambag'allik tadqiqotlari (20-asr boshlari)**			
3.1	Utilitarizm va ijtimoiy tadqiqotlar	18-19-asr	Umumiy varovonlikni ko‘paytirish siyosatlarini, shu jumladan kambag‘allikni kamaytirishni targ‘ib qilgan.	varovonlik va is’temolni bir tomonda, kambag‘allikka oid siyosatlarni esa boshqa tomonda ko‘rsatuvchi tarozi diagrammasi.
3.2	Kambag‘allarga oid qonunlar bo'yicha bahslar	19-asr	Ijtimoiy yordam siyosatining samaradorligi va axloqiy jihatlarini muhokama qilgan.	

3.3	Sotsializm va ishchi harakatlari	19-asr oxiri - 20-asr boshlari	Ishchilar huquqlari va kambag‘allikni bartaraf etish uchun tizimli o‘zgarishlarni qo‘llab-quvvatlagan.	
4.	**Urushdan keyingi qayta baholash va yangi nazariyalar (1950 yildan keyin)**			
4.1	Yangi iqtisodiy fikrlash	1950-yillar	John Rawlsning adolat tamoyillari adolat va tenglikni ta’kidlagan.	Turli ijtimoiy-iqtisodiy guruhlarni muvozanatlashtiruvchi adolat tarozi.
4.2	Amerikada kambag‘allikning qayta kashf etilishi (1960-yillar)	1960-yillar	Farovon jamiyatlarda ham davom etayotgan kambag‘allikni ko‘rsatgan.	"Boshqa Amerika" kitobiva Amerika shaharlarining tasviri.
4.3	Rawlsning adolat tamoyillari	1971	Teng taqsimlash va kambag‘allikka qarshi siyosatga e’tibor qaratgan.	Rawlsning farq tamoyilini ko‘rsatuvchi diagramma, ijtimoiy manfaatlar va eng kam imkoniyatga ega guruhlar.
5.	**20-asr oxiri va global majburiyatlar**			
5.1	Jahon banki shiori (1990)	1990	Kambag‘allikni kamaytirishga global majburiyatni aks ettirgan.	"Bizning orzuyimiz kambag'allikdan xoli dunyo" shiori.
5.2	Global daromad tengsizligi tadqiqotlari	1990-yillar	Global daromad tengsizligi va kambag'allikning tarixiy baholarini taqdim etgan.	Daromad tengsizligi va kambag'allik darajalarini aks ettiruvchi dunyo xaritasi.

6.	**Zamonaviy tushunchalar va ta'sirlar**			
	Iqtisodiy o‘sish va kambag‘allikni kamaytirish	2000-yillar	O‘sish bilan teng taqsimlashni muvozanatlash zarurligini ta’kidlagan.	Iqtisodiy o‘sish tendentsiyalari va kambag‘allikni kamaytirish metrikalarini ko‘rsatuvchi grafik.
6.2	Texnologiya va jamoatchilik xabardorligi	2000-yillar	Kambag‘allikni kamaytirish strategiyalarini shakllantirishda texnologiya va xabardorlikning rolini ko‘rsatgan.	Odamlarni bog‘layotgan texnologiya (kompyuterlar, smartfonlar) belgisi.
6.3	Hukumat aralashuvlari	2000-yillar	Bozor mexanizmlari va ijtimoiy siyosatni muvozanatlashni ta’kidlagan.	Bozor mexanizmlari va ijtimoiy siyosatni muvozanatlashni ta’kidlagan.

Yuqoridagi fikrladan eng katta ahamiyatga va tasirga ega bolganlaridan biri shubhasiz Engel qonunidir. Engel qonunining rivojlanishi: Nemis statistik olimi Ernst Engel 19-asr o‘rtalarida uy xo‘jaliklari xarajatlarini o‘rganish orqali iqtisodiy nazariyaga katta hissa qo‘shdi. U hozirda Engel qonuni deb nomlanuvchi qonunni kashf etdi, u kambag‘al va kambag‘al bo‘lmagan uy xo‘jaliklarini sarf qilish odatlariga ko‘ra farqlash uchun miqdoriy ko‘rsatkichni beradi. Engel qonuni shuni ko‘rsa tadiki, uy xo‘jaliklarining daromadlari oshgani sayin, oziq-ovqatga sarflangan daromadlar ulushi kamayadi. Bu munosabatlar kambag‘al uy xo'jaliklari boyroq uy xo‘jaliklariga qaraganda o‘z daromadlarining katta qismini oziq-ovqatga sarflashini anglatadi. Oziq-ovqatga bo‘lgan talabning daromad egiluvchanligi birdan kam bo‘lib, oziq-ovqat zarurat ekanligini ko‘rsatadi.

Bu qonun kambag‘lik darajasini aniqlashdagi dastlabki o‘lchovlardan bir hisobladi. Bu qonun qo‘llanilishing usulining soddaligi uchun o‘z davrida keng qo‘llanilgan bo‘lsada bugungi kunda faydalish uchun ba’zi kamchiliklarga ega. Birinchidan: Qonun birinchi navbatda oziq-ovqat xarajatlariga qaratilgan bo‘lib, boshqa muhim tovarlar va xizmatlarni e’tiborsiz qoldirishi mumkin; ikkinchidan: oziq-ovqatga bo‘lgan talabning daromad egiluvchanligi turli daromad darajalari va mintaqalarda sezilarli

darajada farq qiladi; uchinchidan: siyosatchilar qonunlarni ishlab chiqishda Engel qonunini noto‘g‘ri talqin qilishlari yoki ortiqcha soddalashtirishlari mumkin. Shuningdek Engel qonuni bog‘liqlikni aniqlaydi, ammo kambag‘allikning asosiy sabablarini tushuntirmaydi. Yuqoridagi kamchiliklarga qaramay bu qonun kambag‘alikni bartaraf qilishda muhum ahamiy kasb etgan voqeylikdab biridir. Yana bir kambag‘allikga qarshi kurashishdagi muhim izalnishlardan biri 19-asr da Charles Booth tomonidan alamalga oshirilgan. Booth ning sinchkovlik bilan o‘tkazgan so‘rovlari va xaritalari Londondagi kambag‘allikni tushunish uchun batafsil empirik asos yaratdi. Ushbu ma’lumotlarga asoslangan yondashuv siyosatchilarga ta’sir qildi va 20-asr boshlarida ijtimoiy islohotlarni shakllantirishda muhim rol o’ynadi. Uning tadqiqotlari Britaniyada ijtimoiy ta’minot siyosatining rivojlanishiga sezilarli ta’sir ko‘rsatdi. Ta’kidlash joizki, u 1908-yilda davlat pensiyasini va 1911-yilda milliy sug‘urtani joriy etishga hissa qo‘shgan. Booth ning xulosalari turli shaharlar va hududlardagi qashshoqlik darajasi haqida keng muhokamalarga sabab bo‘ldi, jamoatchilik xabardorligini oshirdi va ijtimoiy masalalar bo‘yicha munozaralarni kuchaytirdi. Booth ning metodologiyasi va topilmalari qashshoqlik bilan bog‘liq keyingi tadqiqotlarga ta’sir ko‘rsatdi, shu jumladan Yorkdagi Rountree ishi va keyinchalik Qo‘shma Shtatlar va Hindistondagi tadqiqotlarga ham. Uning ishi Chikago sotsiologiya maktabi va boshqa muhim ijtimoiy fanlar tadqiqoti an’analari uchun asos yaratdi. Booth ning amalga oshirgan ishlari o‘z davri uchun tub burulish nuqtasi bo‘lgan ersada ba’zi kamchiliklardan holi emas edi. Booth va Rountree turli xil kambag‘alik chegaralaridan foydalangan, bu esa turli hududlarda kambag‘allik darajasini o‘lchash va taqqoslashda nomuvofiqliklarga olib keldi. Ushbu masala qashshoqlikni bir xilda aniqlash va o‘lchash muammolarini ko‘rsatdi. Booth ma’lumotlarining murakkabligi va kambag‘allikni xaritalashning yangi yondashuvi statistik yoki ijtimoiy fanlar metodologiyasini yaxshi bilmaydiganlar tomonidan noto‘g‘ri talqin qilinishiga olib kelishi mumkin. Bu qashshoqlik va uning sabablari haqida haddan tashqari soddalashtirilgan yoki noto‘g‘ri xulosalar chiqarishga olib kelishi mumkin. Boothning ishi o‘sha paytda asos bo‘lgan bo‘lsa-da, uning topilmalarining kambag‘allikni kamaytirishga uzoq muddatli ta’siri hali ham muhokama qilinmoqda. Olimlarning ta’kidlashicha, uning batafsil xaritalash va tadqiqotlariga qaramay, kambag‘allik asosidagi tizimli muammolar uning ma’lumotlari bevosita ta’sir qilishi mumkin bo‘lgan vositalardan ko‘ra kengroq yechimlarni talab qiladi. Keyns davriga kelib iqtisodiyotga yondashuv birmuncha o‘zgarishlarga uchradi. Keyns “yalpi talab”, iqtisodiy faoliyat va bandlikning harakatlantiruvchi kuchi degan kontseptsiyani kiritdi va bu “yalpi taklif” omillarini ta’kidlagan klassik iqtisodiy nazariyalardan sezilarli darajada chekinishini ko’rsatdi. Uning “Bandlik, foiz va

pulning umumiy nazariyasi” (1936) nomli muhim asari Keyns maktabining nazariy asosini yaratdi. Bu nazariya hukumatning moliyaviy va pul-kredit siyosati orqali aralashuvi iqtisodiy tsikllarni boshqarish va turg‘unlik va iqtisodiy pasayish oqibatlarini yumshatish uchun zarur ekanligini ta’kidlaydi. Keyns iqtisodiy tanazzul davrida ish o‘rinlarini yaratish uchun jamoat ishlari bo‘yicha dasturlarning kuchli ta’rafdori edi. Ushbu dasturlar ishsizlikni kamaytirish va kambag‘allarga daromad keltirish va shu bilan birga umumiy iqtisodiy talabni rag‘batlantirish uchun ishlab chiqilgan edi. Bundan tashqari, uning nazariyalari odamlarni iqtisodiy o‘zgarishlarning salbiy ta’siridan himoya qiladigan ishsizlik sug‘urtasi va farovonlik dasturlari kabi ijtimoiy xavfsizlik tarmoqlarini ishlab chiqishni qo‘llab-quvvatladi. Keyns Xalqaro valyuta jamg‘armasi (XVF) va Jahon banki kabi xalqaro moliya institutlarini yaratgan Bretton-Vuds tizimini(Bretton-Vuds tizimi (Bretton Woods System) — bu xalqaro valyuta-moliya tizimi bo‘lib, Ikkinchi jahon urushidan keyin 1944-yilda AQShning Nyu-Xempshir shtatidagi Bretton-Vuds shahrida bo‘lib o‘tgan konferensiyada asos solingan. Ushbu tizimning maqsadi urushdan keyingi global iqtisodiy barqarorlikni ta’minlash va xalqaro savdoni rivojlantirish edi. Bretton-Vuds tizimi 1971-yilda AQSh prezidenti Richard Nikson AQSh dollarini oltin bilan almashtirish majburiyatini bekor qilganidan so‘ng rasmiy tugadi. Shu tariqa, bu tizimdan so‘ng zamonaviy suzuvchi valyuta kurslari tizimi joriy etildi.) yaratishda hal qiluvchi ro‘l o‘ynadi. Ushbu institutlar global iqtisodiy barqarorlik va rivojlanishni rag‘batlantirishga qaratilgan. Bundan tashqari, ko‘pgina G‘arb davlatlari Ikkinchi jahon urushidan keyin davlatlarining farovonligini rivojlantirishda Keyns tamoyillarini qabul qildilar, bu esa kambag‘allikning sezilarli darajada qisqarishiga va turmush darajasining yaxshilanishiga olib keldi. Keyns iqtisodi ko‘pincha progressiv soliqqa tortishni qo‘llab-quvvatlaydi, bu erda yuqori daromadlilar yuqori stavkada soliqqa tortiladi, bu daromadlarni qayta taqsimlashga va iqtisodiy tengsizlikni kamaytirishga yordam beradi. Iqtisodiy tsikllarni yumshatish siyosatini qo‘llab-quvvatlagan holda, Keyns iqtisodi kambag‘allarga nomutanosib ravishda ta’sir ko‘rsatadigan ekstremal yuksalishlar va inqirozlarning oldini olishga yordam beradi. Biroq, hukumat aralashuvining kuchayishi samarasizlikka, byurokratik qog‘ozbozlikka va resurslarning noto‘g‘ri taqsimlanishiga olib kelishi mumkin. Hukumat loyihalari har doim ham iqtisodiy faollikni rag‘batlantirishning eng samarali usuli bo‘lishi mumkin emas. Bundan tashqari, taqchillik xarajatlarini moliyalashtirish uchun davlat qarzlari xususiy investitsiyalarni cheklab qo‘yishi mumkin, bu esa potentsial yuqori foiz stavkalariga va uzoq muddatda iqtisodiy o‘sishning pasayishiga olib kelishi mumkin. Keyns siyosati ko‘pincha barqaror o‘sishning uzoq muddatli strategiyasi emas, balki iqtisodiy tanazzulga qisqa muddatli yechim sifatida qaraladi.

Bu siyosatlar hukumat aralashuviga bog‘liq bo‘lib, o‘z-o‘zini ta’minlaydigan iqtisodiyotning rivojlanishiga to‘sqinlik qiladi. Keyinchalik 1960-yillar Qo‘shma Shtatlarda boy jamiyatlardagi doimiy kambag‘allik haqida xabardorlikning kuchayishi bilan tavsiflangan muhim davr bo‘ldi. Ko‘pincha “kambag‘allikning qayta kashf etilishi” deb ataladigan bu davr kambag‘allik chegarasidan pastda yashayotgan millionlab amerikaliklar duch keladigan dahshatli haqiqatlarni ochib berdi. Ushbu qayta kashfiyotda ishtirok etgan asosiy omillar va raqamlar davlat siyosati va ijtimoiy ongga chuqur ta’sir ko‘rsatdi. Maykl Xarringtonning “Boshqa Amerika” (1962) nomli kitobining nashr etilishi aholining kambag‘allik haqida xabardorligini oshirishda muhim ro‘l o‘ynadi. Harringtonning Amerikadagi kambag‘allarning hayotini batafsil tavsifi yashirin kambag‘allikni fosh qildi va ijtimoiy tengsizlik haqida milliy baxsni keltirib chiqardi. Ommaviy axborot vositalarida voqeylikning yoritilishi va jurnalistik surishtiruvlar bu masalani yanada dolzarblashtirib, qashshoqlik haqidagi dalillarni jamoatchilik muhokamasiga olib chiqdi. Bu ogohlik jamiyatning turli sohalarini, jumladan, akademiklar, siyosatchilar va faollarni muammoni tizimliroq hal qilish uchun safarbar etdi. Kambag‘allikning tom ma’noda qayta kashf etilishi muhim siyosiy harakatlarga olib keldi, xususan, Prezident Lindon B. Jonson 1964 yilda "kambag‘allikka qarshi shiddatli urush" e’lon qildi. Bu tashabbus iqtisodiy imkoniyatlar va ijtimoiy imkoniyatlarni yaxshilashga qaratilgan bir qator qonunchilik choralari va dasturlari orqali kambag‘allikni kamaytirishga qaratilgan edi. Ushbu davrda joriy etilgan asosiy dasturlar orasida keksalar va kambag‘allarga tibbiy yordam ko‘rsatadigan “Medicare” va “Medicaid” va kam ta‘minlangan oilalar orasida ochlikni engillashtirishga qaratilgan oziq-ovqat markasi to‘g‘risidagi qonun kiradi. 1964 yildagi Iqtisodiy imkoniyatlar to‘g‘risidagi qonun kambag‘allarning imkoniyatlarini kengaytirish va o‘z-o‘zini ta’minlashni rag‘batlantirish uchun jamoat harakat dasturlari, ish o‘rgatish va ta’lim tashabbuslarini o‘rnatdi. 1960-yillardagi siyosiy tashabbuslar aholining zaif qatlamlariga foyda keltirishda davom etadigan keyingi ijtimoiy xavfsizlik tarmoqlari uchun asos yaratdi. Erta bolalik davridagi ta’lim va kengaytirilgan ijtimoiy ta’minot imtiyozlari kabi “Head Start” dasturlar kambag‘allikni kamaytirish va hayot sifatini yaxshilashga doimiy ta’sir ko‘rsatdi. Kambag‘allikni yumshatishga qaratilgan e’tibor, shuningdek, mehnat bozorida kengroq ishtirok etish va aholi orasida iste’mol xarajatlarini oshirish orqali iqtisodiy o‘sishga yordam berdi. Bu sohada ko‘zga koringan nazariyalardan biri Jon Roulzning “Adolat nazariyasi”. Amerikaning taniqli faylasufi Jon Roulz “Adolat nazariyasi” (1971) nomli muhim asari bilan siyosiy falsafaga katta hissa qo‘shdi. Roulsning adolat tamoyillari ijtimoiy adolat, iqtisodiy tengsizlik va qashshoqlikni bartaraf etish haqidagi zamonaviy munozaralarga chuqur ta’sir ko‘rsatdi. Uning nazariy asoslari adolatli jamiyat

yaratishga qaratilgan siyosatni baholash va loyihalash uchun asos bo‘lib xizmat qiladi. Roulsning birinchi printsipi har bir insonning to‘liq adekvat asosiy erkinlik sxemasida teng huquqqa ega ekanligini ta’kidlaydi, bu esa boshqalar uchun o‘xshash erkinliklar sxemasiga mos keladi. Bu tamoyil adolatli jamiyatning asosi sifatida so‘z va vijdon erkinligi kabi shaxs erkinliklari va huquqlarini himoya qilish muhimligini ta’kidlaydi. Asosiy erkinliklarga e’tibor kambag‘allikni bartaraf etishga qaratilgan siyosatlar shaxsiy erkinliklarni buzmasligini ta’minlaydi. U kattaroq iqtisodiy tenglikka erishishga harakat qilganda ham saqlanishi kerak bo‘lgan huquqlarning asosini belgilaydi. Farq printsipi - bu Roulsning adolatning ikkinchi printsipi bo‘lib, unda ijtimoiy va iqtisodiy tengsizliklar jamiyatning eng kam imtiyozli a’zolariga eng katta foyda keltiradigan tarzda tartibga solinishi kerak. Ushbu tamoyil eng kambag‘al shaxslarning farovonligini oshirishga qaratilgan qayta taqsimlash siyosati uchun kuchli dalil beradi. Eng kam foyda ko‘rganlarning ehtiyojlarini birinchi o‘ringa qo‘yib, farq tamoyili progressiv soliqqa tortish, ijtimoiy ta’minot dasturlari va ijobiy harakatlar kabi choralarni qo‘llab-quvvatlaydi. Ushbu siyosatlar qashshoqlikni kamaytirish va iqtisodiy va ijtimoiy tenglikni oshirishga qaratilgandir. Rouls, shuningdek, imkoniyatlarning adolatli tengligini ta’kidlaydi, bu o‘xshash qobiliyat va iste’dodlarga ega bo‘lgan shaxslar, ularning ijtimoiy kelib chiqishidan qat’i nazar, teng muvaffaqiyatga erishishni talab qiladi. Ushbu tamoyil ta’lim, sog’liqni saqlash va ish bilan ta’minlash imkoniyatlaridan teng foydalanishni ta’minlashga qaratilgan sa’y-harakatlarga asoslanadi. Ushbu tamoyildan ilhomlangan siyosatlar kam ta’minlangan guruhlarning resurslar va imkoniyatlardan foydalanishiga to‘sqinlik qiladigan to‘siqlarni bartaraf etishga qaratilgan. Ular kam ta’minlangan talabalar uchun stipendiya dasturlari, kamsitishlarga qarshi qonunlar va sog‘liqni saqlash subsidiyalari kabi tashabbuslarni o‘z ichiga olishi mumkin. Rouls nazariyasining asosiy kamchiliklaridan biri uning mavhum va idealistik tabiatidir. Adolat tamoyillari gipotetik stsenariylardan kelib chiqqan bo‘lib, ular real vaziyatlarning murakkabliklari va amaliy jihatlarini to‘liq aks ettira olmasligi mumkin. Rauls tamoyillarini aniq siyosat ishlab chiqishda qo‘llash qiyin, chunki u mavhum tushunchalarni amaldagi dasturlar va qonunchilikka aylantirishni talab qiladi. Rouls tamoyillari barcha madaniy va ijtimoiy kontekstlarga to‘liq mos kelmasligi mumkin bo‘lgan muayyan falsafiy an’anaga asoslanadi. Turli jamiyatlarda adolat va hukumatning roli haqida turli xil tushunchalar mavjud bo‘lib, ular Rauls siyosatining qabul qilinishi va samaradorligiga ta’sir qiladi. Rouls tamoyillarini turli kontekstlarga moslashtirish mahalliy qadriyatlar, an’analar va ijtimoiy me’yorlarni hisobga olgan holda nozik yondashuvni talab qiladi. Keyinchalik 1990 yilda Jahon banki qashshoqlikni qisqartirish bo‘yicha global majburiyatni aks ettiruvchi “Bizning orzuimiz - kambag‘allikdan

xoli dunyo” shiorini qabul qildi. Bu shior institutning turli iqtisodiy va rivojlanish siyosatlari orqali kambag‘allikni bartaraf etish missiyasini qamrab oldi. Jahon bankining ushbu davrdagi strategiyalarida barqaror rivojlanish, iqtisodiy o‘sish va dunyoning eng kambag‘al aholisining turmush darajasini yaxshilashga alohida e’tibor qaratilgan. Ushbu shiorning qabul qilinishi xalqaro hamjamiyat tomonidan kambag‘allikni global miqyosda hal qilish bo‘yicha qat’iy, yagona majburiyatdan dalolat berdi. Bu qashshoqlikka qarshi kurash dasturlari bo‘yicha hamkorlikni va resurslarni taqsimlashni rag‘batlantirib, mamlakatlar bo‘ylab sa’y-harakatlarni jadallashtirishga yordam berdi. Jahon banki tomonidan kambag‘allikni kamaytirishga e’tibor qaratilishi boshqa xalqaro tashkilotlar, ikki tomonlama donorlar va milliy hukumatlarning rivojlanish kun tartibida kambg‘allikni birinchi o‘ringa qo‘yishiga ta’sir qildi. 1990-yillarda Jahon banki tomonidan kambag‘likni qisqartirish bo‘yicha kompleks strategiyalar, jumladan, tuzilmaviy tuzatish dasturlari, infratuzilma, ta’lim va sog‘liqni saqlash sohalariga sarmoya kiritish, shuningdek, rivojlanayotgan mamlakatlarda kichik biznes va tadbirkorlikni qo‘llab-quvvatlash uchun mikromoliyaviy tashabbuslar joriy etildi. Ushbu strategiyalar iqtisodiy o‘sish uchun qulay muhit yaratish, muhim xizmatlardan foydalanishni yaxshilash va ijtimoiy inklyuziyani rag‘batlantirishga qaratilgan bo‘lib, shu bilan kambag‘likning alomatlari va asosiy sabablarini bartaraf etishga qaratilgan. Jahon banki kambag‘allikni o‘lchash va monitoring qilish metodologiyasini ishlab chiqishda hal qiluvchi rol o‘ynadi. Bu turli mamlakatlarda kambag‘allik darajasini baholash uchun standartlashtirilgan mezonni taqdim etgan Xalqaro qashshoqlik chegarasini yaratishni o‘z ichiga oladi. Takomillashtirilgan ma’lumotlarni to‘plash va tahlil qilish ko‘proq maqsadli va samarali tadbirlarni amalga oshirish imkonini berdi, bu esa taraqqiyotni kuzatish va yaxshi natijalarga erishish uchun kerak bo‘lganda siyosatni o‘zgartirishga yordam berdi. Shuningdek 20-asr oxiri va 21-asr boshlarida daromadlarning global tengsizligiga e’tibor kuchaydi, ko‘plab tadqiqotlar turli mamlakatlar va mintaqalar bo‘yicha daromad taqsimotini tushunishga qaratildi. Ushbu tadqiqotlar tengsizlikning tabiati va ko‘lami haqida tanqidiy tushunchalar berdi. Tomas Piketti kabi iqtisodchilar tomonidan global daromad tengsizligi bo'yicha olib borilgan tadqiqotlar mamlakatlar ichida ham, o‘rtasida ham daromad va boylikdagi nomutanosiblik kuchayib borayotganini ta’kidladi. Piketti ishi, xususan, uning “Yigirma birinchi asrdagi kapital” kitobi aholining yuqori foizli qatlamlari o‘rtasida tengsizlik va boylikning kontsentratsiyasining uzoq muddatli tendentsiyalarini ta’kidlaydi. Branko Milanovich daromad taqsimotining tarixiy tahlillari tengsizlik tendentsiyalarining asrlar davomida keng qamrovli ko‘rinishini taqdim etdi va iqtisodiy siyosatlar va global voqealar nomutanosibliklarga qanday ta’sir qilishini ko‘rsatdi. Tadqiqot natijalari progressiv

soliqqa tortish, ijtimoiy xavfsizlik tarmoqlari, ta’lim va sog‘liqni saqlashga investitsiyalar kabi tengsizlikni kamaytirishga qaratilgan siyosat tavsiyalarini ma’lum qildi. Ushbu tavsiyalar hukumatlarga iqtisodiy tenglikni oshirishga yordam beruvchi qayta taqsimlash siyosatini amalga oshirish uchun asos yaratadi. Misol uchun, Jahon tengsizlik laboratoriyasi tomonidan 2018-yilgi “Jahon tengsizlik hisoboti” boylik solig'i va global tengsizlikni bartaraf etish uchun xalqaro hamkorlikni qollab quvvotladi. Tadqiqotlar inklyuziv o‘sish muhimligini ta’kidlaydi, iqtisodiy rivojlanishning afzalliklari jamiyatning barcha qatlamlari orasida keng taqsimlanishini ta’minlaydigan siyosatni qo‘llab-quvvatlaydi. Global daromadlar tengsizligidan xabardorlikning ortishi xalqaro tashkilotlar, nohukumat tashkilotlar va fuqarolik jamiyati guruhlari tomonidan tashviqot ishlariga turtki bo‘ldi. Qarzlarni yumshatish, adolatli savdo va yanada adolatli global iqtisodiy siyosatlar uchun kampaniyalar kuchayib, tengsizlikni bartaraf etish uchun tizimli o‘zgarishlarni talab qilmoqda. Oksfam kabi tashkilotlarning hisobotlari boylikdagi haddan tashqari nomutanosiblikni ta’kidlab, tengsizlikni kamaytirish uchun shoshilinch siyosat aralashuvini talab qildi. Jahon tengsizlik hisoboti kabi nufuzli nashrlar va hisobotlar butun dunyo bo‘ylab jamoatchilik fikri va siyosiy kun tartibiga ta’sir ko‘rsatib, bu masalaga e’tibor qaratdi. Yuqorida holatlardan shuni xulosa qilish mumkunki, dunyo iqtisodiyotiga kambag‘allikni yangi turi yani nisbiy kambag‘allik bugungi dunyo hamjamiyati oldida yechilishi zarur bo‘lgan masala sifatida paydo bo’lib kelmqoda.

XULOSA

Maqolada kambag‘allik tushunchasining falsafiy va tarixiy rivoji keng qamrovda o‘rganilgan. Tarix davomida kambag‘allikka nisbatan turli qarashlar shakllangan bo‘lib, bu masala ijtimoiy, iqtisodiy va siyosiy kontekstlarda muhim o‘rin egallagan. Amir Temur davridan boshlab islomiy nuqtai nazardan kambag‘allikka qarshi kurashda adolat, tenglik va yordam ko‘rsatish tamoyillari asosiy omillar sifatida e’tirof etilgan. Shuningdek, zamonaviy faylasuflar va iqtisodchilarning, jumladan, Jon Rols va Amartya Sen kabi olimlarning nazariyalari kambag‘allikning asosiy sabablarini tushunishga hamda uni bartaraf etish uchun turli strategiyalarni ishlab chiqishga yo‘l ochgan. Maqola, kambag‘allikni iqtisodiy, falsafiy va ijtimoiy jihatdan keng o‘rganib, bu masalani zamonaviy kontekstda hal etishga oid muhim yondashuvlarni taqdim etadi.

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INTENSIV OLMA BOG‘LARIDAGI DARAXTLARNING EKISH SXEMALARINI HOSILDORLIK VA MEVALAR SIFATIGA TA’SIRI

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ANNOTATSIYA

Maqolada intensiv tipdagi olma bog‘laridagi daraxtlarning ekish sxemalarini mevalarning sifatiga ta’sirini o‘rganish bo‘yicha ilmiy asoslangan ma’lumotlar keltirilgan. Aniqlanishicha, olmaning Starkrimson navida sifati yuqori bo‘lgan mevalarning 80% dan ortiq miqdoriga pakana M-IX payvandtagida 3,5x2,0 m, o‘rta bo‘yli MM106 payvandtagida esa 4,0x3,0 m ekish sxemasida ekilgan tajriba variantlarida olindi. Olib borilgan tadqiqot natijalariga ko‘ra olma mevalarini bir tekis yetilishiga ko‘ra 3,5x2,0 m sxemada ekilgan M-IX payvandtagidagi daraxtlardan 81,2% yuqori sifatli mevalar terib olindi. O‘rta bo‘yli MM106 payvandtagidagi daraxtlarni 4,0x3,0 m sxemada ekilgan variantda 79,7% atrofida hamda gektariga 21 t/ga va 18 t/ga yuqori sifatli mevalar terib olindi.

Kalit so‘zlar: Bog‘, payvandtag, navlar, olma, ko‘chat, daraxt, kesish, shakl berish, novda, kurtak, gul, meva, qand miqdori, hosil.

INFLUENCE OF APPLICATION PLACEMENT OF APPLE TREE IN AN INTENSE GARDEN ON HARVEST AND QUALITY OF FRUIT

ABSTRACT

The scientific article provides experimental material devoted to the study of the influence of the Starkrimson apple tree layouts when grown on a weakly vegetatively propagated stock M-IX and medium-sized MM106. With the placement scheme of this variety 3,5x2,0 m, the marketability of fruits averaged 81,2%, rootstock MM106 with a planting plan of 4,0x3,0 meters-79,7%, respectively, with the yield according to the schemes of 21 ton/ha and 18 ton/ha.

Keywords: Garden, stock, varieties, apple tree, seedling, tree, pruning, forming, shoot, bud, flower, fruit, sugar content, harvest.

KIRISH

Respublikamizda bugungi kunda intensiv olma bog‘larining maydonini muntazam oshirib borish, ularni parvarishlash texnologiyasini takomillashtirish hisobiga bog‘dorchilikning samaradorligini oshirish mamlakatimiz mevachilik sohasining dolzarb vazifalaridan biridir. Shu bois so‘nggi

yillarda intensiv olma bog‘larining maydoni qariyb 48 ming gektarga yetkazildi.

Intensiv bog‘lar maydonini kengaytirish, samarasiz eskirgan bog‘larni bosqichma-bosqich rekonstruksiya qilish va intensiv asosga o‘tkazish O‘zbekiston Respublikasi Prezidentining 2017 yil 7 fevraldagi PF-4947-son «O‘zbekiston Respublikasini yanada rivojlantirish bo‘yicha harakatlar strategiyasi to‘g‘risida»gi Farmonida ham alohida belgilab berilgan [1].

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Pakana payvandtaglarda o‘stirish va shox-shabbasiga urchuqsimon shakl berish intensiv olma bog‘larida daraxtlarni gektariga 2 mingdan 5 ming donagacha joylashtirish imkonini beradi. Bu esa gektaridan katta yoshli bog‘larda barqaror 30-40 tonna hosil olishni ta’minlaydia [2; 19-b.].

M.M.Yakubov, D.Q.Nazarovalarning [6; 87–90-b.] Toshkent viloyati sharoitlarida olib borgan tadqiqotlarida Tatura usulida shakllantirilgan bog‘larda daraxtlarning joylashish zichligi o‘rganilgan. Bunda o‘simliklar zich qilib o‘tkazilganda olmaning Rozmarin navi 17 yillik daraxtlari odatdagi masofa bilan ekilgan daraxtlarga nisbatan 30% ga yuqori hosil bergan.

Qator olimlarning fikricha [3; 7–8-b.]; [4; 47–48-b.], ekish sxemasi, ya’ni o‘simlik zichligi meva sifatining shakllanishida muhim rol o‘ynaydi. Olimlarning fikricha nisbatan sara, bir tekis va to‘liq rang olgan mevalar ekstensiv bog‘larda emas, aksincha intensiv bog‘larda yetishtiriladi deb ta’kidlashgan [5; 11–13-b.].

Tajribalar “Mevachilik va uzumchilik” kafedrasida ishlab chiqilgan uslub bo‘yicha olib borildi. Dala tajribalari Toshkent davlat agrar universitetning ilmiy tadqiqot va o‘quv-tajriba xo‘jalik stansiyasidagi hosilli olma bog‘ida o‘tkazildi. Biometrik o‘lchovlar va hisoblar: har bir variantda 10 ta o‘simlikda olib borildi. Tajriba to‘rt qaytariqda o‘rganildi.

Tajribalar X.Ch.Buriev va boshqalarning «Mevali va rezavor mevali o‘simliklar bilan tajribalar o‘tkazishda hisoblar va fenologik kuzatuvlar metodikasi» (2014), V.F.Moiseychenkoning «Metodika uchetov i nablyudeniy v opitax s plodovimi i yagodnimi kulturami» (1967) nomli uslubiy adabiyotlarida keltirilgan tavsiyalarga muvofiq va Tajriba ma’lumotlariga statistik ishlov berish B.A.Dospexov (1985) uslubi bo‘yicha dispersion tahlildan o‘tkazildi.

TADQIQOT NATIJALARI

Hosildorlik har qanday qishloq xo‘jaligi ekinlarida qo‘llanilgan agrotexnik tadbirning samaradorligini ko‘rsatuvchi muhim indikator hisoblanadi. Shu bois bugungi kunda tuproq unumdorligi, suv, quyosh energiyasi va mavjud moddiy resurslardan foydalangan holda qishloq xo‘jaligi ekinlaridan yuqori hosil yetishtirish qishloq xo‘jaligi mutaxassislari oldida turgan dolzarb vazifa hisoblanadi.

Shu bois butun dunyoda bugungi kunda intensiv bog‘dorchilikda daraxtlar oralig‘ini maksimal zichlashtirish hisobiga maydon birligidan eng yuqori hosil olishni ta’minlovchi ekish

sxemalarini qo‘llash bo‘yicha izlanishlar olib borilmoqda. Negaki, intensiv bog‘dorchilikni jadallashtirish to‘liq hosilga tez kiruvchi, muntazam barqaror va sifatli hosil beradigan, minimal mehnat sarflanuvchi bog‘larni yaratishni ko‘zda tutadi.

Mevalarning tovar sifatlarini ekish sxemasiga bog‘liqligini o‘rganish bo‘yicha kuzatuvlarimizda ularning bir tekisliligini baholash uchun nav tavsifida keltirilgan diapazon mezon sifatida olindi:

Nav	**mayda mevalar**	**tovarbop mevalar**	**o‘ta yirik mevalar**
Starkrimson	< 140 gr	140-170 gr.	170 gr. <

Kuzatuvlarimiz shuni ko‘rsatdiki, bir tekis va intensiv rang olgan mevalar miqdori zichlashtirilgan ekish sxemalarda ustunlik namoyon etdi. Binobarin, M-IX payvandtagida o‘stirilgan olmaning kuzgi Starkrimson navining mevalari o‘rtacha 140-170 gramm atrofida bo‘ladi. Bizning tajribalarimizda ushbu diapazondagi mevalarning eng yuqori – 81,2% miqdori 3,5x2,0 m sxemada barpo etilgan bog‘da qayd etildi. Quyidagi 1-rasm ma’lumotlari shuni ko‘rsatadiki, ekish zichligi oshirilganda mayda mevalar soni ortib, yirik mevalar miqdori kamayib bordi va aksincha siyrak ekilgan daraxtlarda yirik mevalar miqdori birmuncha yuqori bo‘ldi. Biroq juda zich ekib yuborilganda mayda mevalar miqdori birmuncha ortganligi qayd etildi.

O‘rta bo‘yli MM106 payvandtagida o‘stirilganda ham olmaning kuzgi Starkrimson navi mevalarining bir tekislik darajasi yuqoridagi payvandtagda kuzatilgan tendensiyaga ega bo‘ldi. Faqatgina ushbu holatda payvandtagning o‘sish kuchiga biroz bog‘liq holda barcha ekish sxemalarida birmuncha yuqori bo‘lganligi qayd etildi. Ushbu payvandtag turida bir tekis mevalarning eng yuqori foizi 4,0x3,0 m sxemada qayd etildi (1-jadval).

1-jadval

Olmaning kuzgi Starkrimson navi mevalarining sifatiga daraxtlarni ekish sxemalari va payvandtaglarini ta’siri

Variantlar	**<140 g.**	**140-170 g.**	**170 g. <**	**<140 g.**	**140-170 g.**	**170 g. <**
	M-IX payvandtagida, %			**MM106 payvandtagida, %**		
3,5 x 3,0	4,7	74,6	20,7	4,8	71,6	23,6
3,5 x 2,5 – nazorat	5,4	78,3	16,3	5,7	76,2	18,1
3,5 x 2,0	8,6	81,2	10,2	7,1	79,7	13,2
3,5 x 1,5	14,7	76,3	8	17,1	73,5	9,4

MUHOKAMA

Juda zichlashtirib yuborilganda esa ushbu omilning yana pasaya boshlashi qayd etildi. Binobarin, pakana M-IX payvandtagida o‘stirilgan daraxtlar mevasining bir tekisligi qatordagi o‘simliklar oralig‘i 3,0 m dan 2,0 m gacha kamaytirilganda ortib bordi. O‘simliklar oralig‘ini bundanda yaqinlashtirish (1,5 m) bir tekislik darajasining yana pasayishiga sabab bo‘ldi. Jadval ma’lumotlaridan ko‘rinadiki, bir tekis mevalarning yung yuqori – 81,2% miqdori

3,5x2,0 m sxemada joylashtirilgan daraxtlardan terib olindi.

O‘rta bo‘yli MM106 payvandtagida ham mevaning bir tekisligi bo‘yicha tafovutlar yuqoridagi kabi tendensiyada ifodalandi. Ushbu payvandtagda bir tekis mevalar 4,0x3,0 m sxemada eng yuqori, ya’ni 79,7% atrofida bo‘ldi.

XULOSA

Olmaning Starkrimson navi mevalarning bir tekis yetilishi ekish sxemasiga bog‘liq bo‘lib, o‘simliklar qalinligi oshirilgan sari ma’lum qalinlikkacha ortib boradi. Juda zichlashtirib yuborilganda esa ushbu omilning yana pasaya boshlashi qayd etiladi. Bir tekis mevalarning eng yuqori – 80% dan ortiq miqdoriga pakana M-IX payvandtagida 3,5x2,0 m, o‘rta bo‘yli MM106 payvandtagida esa 4,0x3,0 m ekish sxemasida erishiladi.

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INGLIZ VA O‘ZBEK TILIDA OLIMPIADA SPORT TURLARIGA OID LEKSIKANING UMUMIY TAVSIFI

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ANNOTATSIYA

Ushbu maqolada Olimpiada sport turlariga oid ingliz va o‘zbek tillaridagi leksikaning umumiy tavsifi bayon etilgan. Olimpiada o‘yinlari sport atamalarining xalqaro miqyosda qanday tarqalishi va tillarga ta’siri tahlil qilingan. Ingliz tilidagi sport atamalari ko‘pincha global terminologiyaning asosini tashkil etsa, o‘zbek tilida ularning o‘zlashtirilishi va tarjima jarayonlari alohida o‘rganilgan. Maqolada sport leksikasining har ikki tildagi o‘xshashliklari va farqlari, shuningdek, atamalarning madaniy ta’sirlari haqida ham fikr yuritiladi.

Kalit so‘zlar: Olimpiada o‘yinlari, sport leksikasi, ingliz tili, o‘zbek tili, sport atamalari, xalqaro terminologiya, madaniy xilma-xillik, leksik tahlil, sport turlari, til moslashuvi, leksik farqlar, terminologiya.

ABSTRACT

This article describes the general description of the lexicon related to Olympic sports in English and Uzbek languages. The spread of sports terms of the Olympic Games at the international level and their influence on languages are analyzed. While sports terms in English often form the basis of global terminology, their acquisition and translation processes in Uzbek have been studied separately. The article discusses the similarities and differences of the sports lexicon in both languages, as well as the cultural implications of the terms.

Keywords: Olympic Games, sports lexicon, English language, Uzbek language, sports terms, international terminology, cultural diversity, lexical analysis, types of sports, language adaptation, lexical differences, terminology.

KIRISH

Olimpiada o‘yinlari dunyoning eng mashhur sport tadbirlaridan biri bo‘lib, uning doirasida ko‘plab turli millat va madaniyat vakillari sportda o‘z mahoratlarini namoyon etishadi. Bu tadbir nafaqat sportning yuksak yutuqlarini, balki madaniy va tillarning xilma-xilligini ham aks ettiradi. Olimpiada sport turlari uchun ishlatiladigan leksika o‘yinlarda

ishtirok etuvchi barcha tillarda o‘z aksini topib, sport atamalari turli tillarda qanday namoyon bo‘lishiga yaqqol misoldir. Olimpiada sport turlariga oid ingliz va o‘zbek tillaridagi leksikaning tahlili, ushbu ikki tilning sport sohasidagi umumiy va o‘ziga xos xususiyatlarini ko‘rsatishda muhim ahamiyatga ega.

Sport leksikasining tabiati va xususiyatlari

Leksika — har qanday tilning asosiy qismi bo‘lib, u ma’lum bir fan, sohani yoki yo‘nalishni ifodalaydi. Sport leksikasi esa turli sport turlari, musobaqalar, qoidalar va ishtirokchilarga oid so‘zlar va atamalarni o‘z ichiga oladi. Olimpiada sport turlariga oid leksika sport sohasida ishlatiladigan maxsus atamalar yig‘indisidan iborat bo‘lib, ularning aksariyati sport turlari nomlari va faoliyatlarini ifodalaydi.

Ingliz tilidagi sport leksikasi jahon bo‘ylab keng qo‘llaniladigan xalqaro leksika hisoblanadi. Olimpiada sport turlarining ko‘pchiligi ingliz tilidan tarqalgan yoki uning ta’sirida global terminologiyaga aylangan. Masalan, *"track and field" (atletika), "swimming" (suzish), "gymnastics" (gimnastika)* kabi atamalar turli tillarga asosan bir xil ma’noda kirib kelgan.

O‘zbek tilidagi sport leksikasi esa asosan kirilgan xalqaro atamalarni o‘zlashtirish orqali shakllangan. Ayniqsa, zamonaviy sport terminlari ingliz va rus tillaridan kirib kelib, o‘ziga xos o‘zbeklashtirilgan ko‘rinishlarini olgan. Masalan, *"chempionat", "olimpiada", "medallar"* kabi atamalar sport sohasida keng qo‘llaniladi. Ammo ayrim sport turlari o‘zbek tiliga to‘g‘ridan-to‘g‘ri tarjima qilinmay, shu tillardagi mavjud atamalar asosida qo‘llaniladi. Masalan, "volleyball" — voleybol, "basketball" — basketbol kabi so‘zlar o‘zbek tilida ham shunday aytiladi.

MUHOKAMA

Olimpiada sport turlari va leksik almashuv

Olimpiada o‘yinlari doirasidagi leksika to‘g‘ridan-to‘g‘ri ingliz tilidagi atamalardan tarjima qilinib yoki qo‘llanilib, xalqaro leksik birliklarga aylanadi. Olimpiada sport turlarining nomlari ko‘pincha hech qanday o‘zgarishga uchramaydi. Masalan, o‘zbek tilida ham atletika, futbol, tennis, voleybol so‘zlari asliya holatda ishlatiladi.

Biroq, ba’zi sport turlari uchun o‘zbek tilida o‘ziga xos tarjima qilingan atamalar ham mavjud. Masalan:

- **Track and field — yo‘l va maydon sport turlari**.
- **Weightlifting — og‘ir atletika**.
- **Figure skating — figurali chang‘ida uchish**.

O‘zbek tilida olimpiada sport turlariga oid leksik birliklar yaratish jarayonida asosan xalqaro atamalarni soddalashtirishga va

ularni o‘zbek tilining fonetik qoidalariga moslashtirishga harakat qilingan. Bu jarayonda ikki tildagi umumiy atamalar bir-biriga juda yaqin bo‘lsa-da, madaniy va ijtimoiy ta’sirlar tufayli ba’zi farqlar ham kuzatiladi.

Sport leksikasidagi o‘xshashliklar va farqlar

Ingliz va o‘zbek tillarida Olimpiada sport turlariga oid leksik birliklar o‘rtasida muayyan umumiyliklar mavjud bo‘lsa-da, ularning qo‘llanilishidagi farqlar tilning ichki qonun-qoidalari va madaniy o‘ziga xosliklarga bog‘liq.

Ingliz tili ko‘pincha sport atamalarini umumiylashtiruvchi va soddalashtiruvchi til sifatida tan olingan. Unda atamalar qisqa va oson tushunarli bo‘lib, sport terminologiyasi xalqaro miqyosda qo‘llaniladi. Masalan, "gold medal" (oltin medal), "referee" (hakam), "championship" (chempionat) so‘zlari dunyo bo‘ylab tushunish oson bo‘lgan atamalar sifatida tan olingan.

O‘zbek tili esa ushbu atamalarni qo‘llanishida o‘ziga xos yo‘lni tutgan. Ba’zi hollarda atamalarni to‘g‘ridan-to‘g‘ri qabul qilish o‘rniga, ularni o‘zlashtirish va tarjima qilishga harakat qilinadi. Masalan, "referee" so‘ziga o‘rinbosar sifatida "hakam" so‘zi qo‘llaniladi.

Leksikaning xalqaro mustahkamlanishi

Olimpiada o‘yinlari kabi yirik xalqaro tadbirlar sport atamalarining dunyodagi turli tillarga kirib kelishi va sport sohasida yagona terminologiyaning shakllanishiga xizmat qiladi. Bunda asosan ingliz va fransuz tillaridan kirib kelgan atamalar asos bo‘lib, bu atamalarning turli tillarga moslashuvi har bir mamlakatning til madaniyatiga bog‘liq.

XULOSA

Olimpiada sport turlariga oid leksika ikki tilda ham (ingliz va o‘zbek) sport sohasidagi muhim atamalar yig‘indisi bo‘lib, ularning umumiy va farqli jihatlari tillarning leksik imkoniyatlari bilan bog‘liq. Sport leksikasining xalqaro ahamiyati uning turli tillarda o‘zgarishsiz qabul qilinishida namoyon bo‘lsa-da, har bir tilda madaniy o‘zgarishlar uning semantik va fonetik tarkibiga ta’sir ko‘rsatadi. Olimpiada o‘yinlari kabi yirik sport tadbirlari sport leksikasining xilma-xilligini boyitadi va turli tillar o‘rtasidagi o‘zaro aloqalarni mustahkamlaydi.

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PAST BO‘YLI OLMA DARAXTLARIGA SHAKL BERISH USULLARINI HOSILDORLIKKA TA’SIRI

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ANNOTATSIYA

Maqolada olmani past bo‘yli payvandtaglarida o‘stirilgan daraxtlar shox-shabbasiga shakl berish usulining hosildorlikka ta’sirini aniqlash yuzasidan ilmiy-tadqiqot ishlari olib borilgan va pakana bo‘yli MIX payvandtagida o‘stirilgan olmani kuzgi Golden Delishes va qishki Fudji navlariining maydon birligidagi hosildorligi kesish va shakl berish usullariga bog‘liqligi aniqlangan.

Kalit so‘zlar: Bog‘, payvandtag, navlar, olma, ko‘chat, daraxt, shakl berish, kesish, fotosintez, shox-shabba, meva, hosil.

INFLUENCE OF METHODS FORMATION OF THE CROWN ON THE YIELD OF THE WEAKLY TREES OF APPLE-TREE

ABSTRACT

The scientific article cites experimental material on the study of the effect of types of low-growing rootstocks and intensive methods of crown formation on the productivity of an apple tree when it is grown by intensive technology. It was established by experiments that the optimal stock for growing Golden Delicious and Fuji varieties is M9, and the method of crown formation is sparsely longline palmette.

Keywords: garden, stock, varieties, apple tree, seedlings, tree, formirovka, crown, branches, fruit, harvest.

KIRISH

Dunyo bo‘yicha olma yetishtirishda yetakchilik qilayotgan Xitoy, AQSh (Kaliforniya), Turkiya, Serbiya, Polsha, Rossiya, Yaponiya kabi mamlakatlarda super pakana, pakana va o‘rta bo‘yli olma bog‘larida payvandtag turlaridan tashqari bog‘ sharoitida daraxtlarni joylashtirish sxemalari va ularga shakl berishning takomillashtirilgan usullari ishlab chiqilgan.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Daraxtlarning kesilish sifati va shox-shabbasining shakliga ko‘ra, uning yortilganlik darajasi, undan kelib chiqqan holda esa

muayyan bog‘ning intensivlik darajasi, fotosintez mahsuldorligi va pirovard natija – yuqori hosil to‘g‘risida fikr yuritish mumkin bo‘ladi. Negaki, bog‘ assimilyatsiya sathining yorug‘lik tartibi qanchalik mo‘tadil bo‘lsa, fotosintez shunchalik yaxshi kechadi va mahsuldorlik ham shunchalik yuqori bo‘ladi. Bu esa daraxtlarni muntazam va ilmiy asoslangan kesish usuli hamda uning qay darajada o‘tkazilish sifatiga bevosita bog‘liq bo‘lib qolaveradi [2], [4], [3], [5], [3], [1].

Tajribalar “Mevachilik va uzumchilik” kafedrasida ishlab chiqilgan uslub bo‘yicha olib borildi. Dala tajribalari Toshkent davlat agrar universitetning ilmiy tadqiqot va o‘quv-tajriba xo‘jalik stansiyasidagi hosilli olma bog‘ida o‘tkazildi. Biometrik o‘lchovlar va hisoblar: har bir variantda 10 ta o‘simlikda olib borildi. Tajriba to‘rt qaytariqda o‘rganildi.

Tajribalar X.Ch.Buriev va boshqalarning «Mevali va rezavor mevali o‘simliklar bilan tajribalar o‘tkazishda hisoblar va fenologik kuzatuvlar metodikasi» (2014), V.F.Moiseychenkoning «Metodika uchetov i nablyudeniy v opitax s plodovimi i yagodnimi kulturami» (1967) nomli uslubiy adabiyotlarida keltirilgan tavsiyalarga muvofiq va Tajriba ma’lumotlariga statistik ishlov berish B.A.Dospexov (1985) uslubi bo‘yicha dispersion tahlildan o‘tkazildi.

TADQIQOT NATIJALARI

Bizning past bo‘yli olma bog‘lar mahsuldorligiga shox-shabbani kesish va ularga shakl berish usulining ta’sirini aniqlash yuzasidan olib borgan tajribalarimiz shuni ko‘rsatdiki, pakana MXI payvandtagida o‘stirilgan olmani kuzgi Golden Delishes navining maydon birligidagi hosildorligi kesish usuliga ko‘ra sezilarli farqlandi. Kuzatuvlar shuni ko‘rsatdiki, Golden Delishes navining bir daraxtdan olingan o‘rtacha hosili siyrak yarusli palmetta (90º) (SYaP) shakl berish usulida nazoratga nisbatan eng yuqori ko‘rsatkichlarda bo‘ldi. Binobarin, nazorat varianti – Urchuqsimon tup - Shpindelbush (UTSh) kesish usulida bir daraxtning o‘rtacha hosili tadqiqot yillari bo‘yicha mos holda 11,8-15,3 kg bo‘lgan bo‘lsa, SYaP shakl berish usulida12,9-18,2 kg gacha yetdi.

Olmaning kuzgi Golden Delishes navida shox-shabbaga shakl berish usuliga bog‘liq ravishda eng kam hosil qiya (70º) palmetta (QP) usulida qayd etildi. Shakl berishning ushbu usulida bir daraxtning o‘rtacha hosili yillar bo‘yicha 11,7 dan 18,75 kg gacha ortib bordi. Bu esa nazorat variantidan mos holda 0,1-0,38 kg ga kamroq bo‘ldi, ya’ni nazorat varianti darajasida bo‘ldi. Italyan palmettasi (IP) usulida shakl berilganda esa ushbu ko‘rsatkich avvalgi tajriba variantlari o‘rtasida oraliq o‘rin egalladi. Bir daraxtdan olingan o‘rtacha hosilga bog‘liq ravishda bir gektardan olingan nazariy hosildorlik ham yuqoridagi kabi tendensiya asosida farqlandi. Binobarin, maydon birligidan

nazoratga nisbatan olingan eng yuqori hosildorlik, qoidaga muvofiq SYaP shakl berish usulida qayd etildi. Shakl berishning ushbu usulida hosildorlik yillar bo‘yicha 16,13 t/gadan 22,75 t/ga gacha ortib bordi, yoki nazoratga nisbatan olingan qo‘shimcha hosil yillar bo‘yicha mos holda 1,38-3,62 t/ga ni tashkil etdi. Eng kam yalpi hosil QP shakl berish usulida qayd etildi, ushbu shakl berish usulida maydon birligidan yetishtirilgan jami hosil 14,63-18,75 t/ga oralig‘ida bo‘ldi. IP shakl berish usuli esa bir daraxtdan olingan o‘rtacha hosilga bog‘liq ravishda oraliq o‘rin egalladi va hosildorlik 15,38-21,0 t/ga oralig‘ida o‘zgardi. Bu esa nazoratga nisbatan 0,63-1,87 t/ga ortiqcha hosil demakdir.

Har xil shakl berish usulida o‘stirilgan olmani qishki Fudji navining hosildorligini qiyosiy tahlil qilish kuzgi Golden Delishes naviga nisbatan boshqacha holatni qayd etish imkonini berdi. Binobarin, olmaning kuzgi Golden Delishes navida eng yuqori hosildorlik SYaP usulida kuzatilgan bo‘lsa, Fudji navida esa ushbu ko‘rsatkichning eng yuqori ifodasi IP usulida shakl berilganda qayd etildi. Ushbu shakl berish usulida Fudji navining har bir daraxtdan olingan hosili tadqiqot yillari bo‘yicha 12,9 dan 19,9 kg gacha yoki nazoratga nisbatan 2,9-4,13 kg ga ortiq bo‘ldi. Olmaning ushbu navida har bir daraxtdan olingan o‘rtacha hosilning nazoratdan kamayishi holatlari kuzatilmadi. Binobarin qolgan – SYaP va QP shakl berish usullarida ushbu ko‘rsatkichlar o‘zaro yaqin qiymatlarga ega bo‘ldi va IP shakl berish usuli hamda nazorat varianti o‘rtasida oraliq o‘rin egalladi. Maydon birligida yetishtirilgan hosil bir daraxtning o‘rtacha hosiliga bog‘liq ravishda IP shakl berish usulida eng yuqori bo‘ldi. Ushbu shakl berish usulida hosildorlik tadqiqot yillari bo‘yicha mos holda 17,75 dan 24,88 t/ga gacha ortib bordi, bu esa nazorat variantiga nisbatan 3,62-4,13 t/ga qo‘shimcha hosil yetishtirish imkonini berdi.

Olmaning qishki Fudji navi daraxtlari shox-shabbasiga SYaP va QP usullarida shakl berishda nazoratga yaqin, ammo birmuncha yuqori hosil yeishtirish imknini berdi. Tadqiqot yillari bo‘yicha ushbu shakl berish usullarida yetishtirilgan yalpi hosil mos holda 16,13-21,88 va 15,75-21,63 t/ga oralig‘ida bo‘ldi. Bu esa nazorat varianti darajasida bo‘lsada, biroz ko‘proq, ya’ni 2,0-1,13 va 1,62-0,88 t/ga qo‘shimcha hosil olish imkonini berdi.

XULOSALAR

Bir daraxtdan olingan o‘rtacha hosilga bog‘liq ravishda, maydon birligidan nazoratdagi variantga nisbatan olingan eng yuqori hosildorlik, siyrak yarusli palmetta shakl berish usulida qayd etildi. Shakl berishning ushbu usulida Golden Delishes navining hosildorligi yillar bo‘yicha 16,13 t/gadan 22,75 t/ga gacha ortib bordi, yoki nazoratga nisbatan olingan qo‘shimcha hosil yillar bo‘yicha mos holda 1,38-3,62 t/ga ni tashkil etdi.

1-jadval

Shox-shabbaga shakl berish usuliga bog‘liq ravishda olmanavlari daraxtlarining hosildorligi (ekilgan yili 2015, ekish sxemasi 4,0x2,0 m)

Tajriba varianti	Yillar bo‘yicha hosildorlik					
	2021		2022		2023	
	bir daraxtdan, kg	maydon birligidan, t/ga	bir daraxtdan, kg	maydon birligidan, t/ga	bir daraxtdan, kg	maydon birligidan, t/ga
Olmaning kuzgi Golden Delishes navi						
Urchuqsimon tup - Shpindelbush – naz.	11,8	14,75	14,2	17,75	15,3	19,13
Italyan palmettasi	12,3	15,38	15,1	18,88	16,8	21,00
Siyrak yarusli palmetta (90º)	12,9	16,13	16,3	20,38	18,2	22,75
Qiya palmetta (70º)	11,7	14,63	14,8	18,50	15,0	18,75
Olmaning qishki Fudji navi						
Urchuqsimon tup - Shpindelbush – naz.	11,3	14,13	14,1	17,63	16,6	20,75
Italyan palmettasi	14,2	17,75	17,2	21,50	19,9	24,88
Siyrak yarusli palmetta (90º)	12,9	16,13	15,3	19,13	17,5	21,88
Qiya palmetta (70º)	12,6	15,75	15,5	19,38	17,3	21,63

Fudji navida italyan palmetta shakl berish usulida eng yuqori hosildorlik kuzatildi. Ushbu shakl berish usulida hosildorlik tadqiqot yillari bo‘yicha mos holda 17,75 dan 24,88 t/ga gacha ortib bordi, bu esa nazorat variantiga nisbatan 3,62-4,13 t/ga qo‘shimcha hosil yetishtirish imkonini berdi.

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REAL HAYOT VAZIYATLARI ORQALI TILNI O‘RGANISH: FUNKSIONAL YONDASHUV

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ANNOTATSIYA

Ushbu maqolada tilni o‘rganishda funksional yondashuv, ya’ni real hayot vaziyatlari orqali tilni amaliyotda qo‘llash usuli tahlil qilinadi. Funksional yondashuv tilni nazariy bilim sifatida emas, balki kundalik hayotda qo‘llashga yo‘naltirilgan vosita sifatida o‘rgatishga qaratilgan. Maqolada ushbu yondashuvning asosiy tamoyillari va afzalliklari bayon etiladi, jumladan, tilni real hayotda qo‘llash, interaktiv mashg‘ulotlar, shaxslararo muloqot ko‘nikmalarini rivojlantirish kabi jihatlar ta’kidlanadi. Funksional yondashuv talabalarning o‘z bilimlariga ishonchini oshirib, ularning tilni o‘rganishga bo‘lgan qiziqishini kuchaytiradi. Tilni o‘rganish samaradorligini oshirish uchun mazkur yondashuv muhim ahamiyatga ega ekanligi ta’kidlanadi.

Kalit so‘zlar: funksional yondashuv, til o‘rganish metodlari, real hayot vaziyatlari, kommunikativ yondashuv, interaktiv mashg‘ulotlar, rolli o‘yinlar, tilni amaliy qo‘llash, shaxsiyatlararo muloqot, motivatsiyani kuchaytirish, amaliyotga yo‘naltirilgan ta’lim

ABSTRACT

This article analyzes the functional approach to language learning, that is, the method of using the language in practice through real-life situations. The functional approach is aimed at teaching the language not as theoretical knowledge, but as a tool aimed at applying it in everyday life. The article describes the main principles and advantages of this approach, including the use of language in real life, interactive training, and the development of interpersonal communication skills. The functional approach increases students' confidence in their knowledge and increases their interest in language learning. It is emphasized that this approach is important for increasing the effectiveness of language learning.

Keywords: functional approach, language learning methods, real-life situations, communicative approach, interactive activities, role-playing games, practical use of language, interpersonal communication, motivational training, practice-oriented education.

KIRISH

Tilni o‘rganish jarayonida turli metod va yondashuvlar mavjud bo‘lib, ularning har biri o‘z uslub va vositalari bilan o‘ziga xos. Ushbu maqolada funksional yondashuv, ya’ni real hayot vaziyatlari orqali tilni o‘rganish metodi haqida so‘z yuritiladi. Funksional yondashuv, til faqat nazariy bilim emas, balki real hayotda, kundalik faoliyatda foydalaniladigan vosita sifatida o‘rgatiladigan usuldir. Bunda tilni o‘rganuvchi shaxs yoki guruh voqelikdan olingan, amaliy vaziyatlarda faol ishtirok etib, tilni foydalanishni o‘rganadi.

ADABIYOTLAR TAHLILI

O‘quvchilarda funksional savodxonlikni shakllantirishda o‘qituvchining kacbiy kompetentligi shakllanishi “kompetensiya” va “kompetentlik” tushunchalarini anglash darajasi bilan bog‘liq[2]. N.A. Muslimov kompetentlikni quyidagicha ta’riflagan: «kompetentlik bu talabaning shaxsiy va ijtimoiy ahamiyatga yega kasbiy faoliyatining amalga oshirilishi uchun zarur bo‘lgan bilim, ko‘nikma va malakalarning yegallanishi hamda ularni kasbiy faoliyatda qo‘llay olishi bilan ifodalanadi»[3].

NATIJALAR

Funksional yondashuvning asosiy tamoyillari. Funksional yondashuv, lingvistika va pedagogikadagi yangilik sifatida, tilning kommunikativ funksiyalarini kuchaytirishga qaratilgan. Bunda tilni o‘rganish jarayonida faol mashg‘ulotlar, vaziyatli rolli o‘yinlar va turli voqeliklardan misollar keltiriladi.

1. **Real hayot kontekstida til o‘rganish**

Tilni faqat grammatik tuzilmalarni o‘rganish bilan cheklash emas, balki turli hayotiy vaziyatlarda undan foydalanishga o‘rgatish talab etiladi. Masalan, do‘konda xarid qilish, jamoat transportida safar qilish yoki restoranda ovqat buyurtma qilish kabi oddiy kundalik faoliyatlarda tildan qanday foydalanish haqida mashg‘ulotlar o‘tkaziladi.

2. **Interaktiv va amaliyotga yo‘naltirilgan mashg‘ulotla**

O‘quvchilarning tilni o‘rganishga bo‘lgan qiziqishlarini oshirish uchun interaktiv mashg‘ulotlar o‘tkazish muhimdir. Rolli o‘yinlar, voqealarni modellashtirish yoki maxsus tayyorlangan simulyatsiyalar orqali talabalar o‘zlari bevosita ishtirok etgan holda tilni o‘rganadilar.

3. **Kommunikativ yondashuv**

Funksional yondashuvning muhim jihatlaridan biri – bu tilni kommunikativ vosita sifatida qo‘llashga e’tibor qaratish. Har bir o‘quv mashg‘uloti talabalarning yozish, gapirish, eshitish va

tushunish ko‘nikmalarini rivojlantirishga qaratilgan bo‘lishi kerak. Tildan foydalanib, o‘zaro muloqot qilish eng asosiy maqsad hisoblanadi.

4. **Masalalarni hal qilishga yo‘naltirilgan yondashuv**

Real hayotda turli muammolarga duch kelish ehtimoli bor. Shunday muammolarni hal qilishga qaratilgan til o‘rganish usullari talaba yoki o‘rganuvchilarni faol ishtirok etishga undaydi. Masalan, yo‘nalish so‘rash, yoki yo‘qolgan narsani topish kabi vaziyatlarda foydalaniladigan so‘zlar va iboralar o‘rganiladi.

Funksional yondashuvning afzalliklari

1. **Tilni real hayotda qo‘llash imkoniyati**

Talabalar faqat nazariy bilimlarga emas, balki kundalik hayotda ularni qanday qo‘llash mumkinligiga amaliyotda o‘rganadilar. Bu ularning o‘z bilimlariga ishonchini oshiradi va tilni o‘rganishga nisbatan qiziqishini kuchaytiradi.

2. **Motivatsiyani kuchaytirish**

Funksional yondashuv orqali talabalarga qiyinchiliklar yengib o‘tish jarayonida tilni qanday ishlatish mumkinligi haqida tushuncha beriladi. Bu ularning o‘quv jarayoniga bo‘lgan motivatsiyasini kuchaytiradi, chunki ular tilni qachon va qaysi vaziyatda qo‘llashlarini aniq bilishadi.

3. **Tilni amaliyotda ishlatish ko‘nikmalarini rivojlantirish**
Turli hayotiy vaziyatlarda tildan foydalanish talaba uchun juda qimmatli bo‘lib, ular turli shart-sharoitlarda o‘z fikrlarini erkin ifodalash imkoniyatiga ega bo‘ladilar. Bu tilni o‘rganish samaradorligini oshiradi.

4. **Shaxsiyatlararo muloqot ko‘nikmalarini rivojlantirish**
Funksional yondashuv orqali talabalar nafaqat tilni, balki shaxslararo munosabatlar o‘rnatishni ham o‘rganadilar. Masalan, muhokamalar, bahslar va hamkorlikdagi loyihalar orqali ular o‘z muloqot ko‘nikmalarini yanada rivojlantirishadi.

Qo‘llash imkoniyatlari

Funksional yondashuv nafaqat tilni o‘rganishga, balki har qanday fan va sohada foydalanilishi mumkin bo‘lgan keng qamrovli pedagogik usul hisoblanadi. Uni maktab, universitet yoki til markazlarida qo‘llash mumkin. Shuningdek, turli kasbiy o‘quv mashg‘ulotlarida ham funksional yondashuvdan foydalanish amaliyotga yo‘naltirilgan ta’lim jarayonini yanada samarali qiladi.

XULOSA

Funksional yondashuv, real hayot vaziyatlari orqali tilni o‘rganish imkoniyati yaratib, talabalarni kundalik hayotda faol ishtirok etishga tayyorlaydi. Bunda ular nazariy bilimlardan ko‘ra amaliy ko‘nikmalarga e’tibor qaratishadi, bu esa tilni chuqur o‘zlashtirish

va undan erkin foydalanish imkonini beradi. Tilni o‘rganish samaradorligini oshirish uchun funksional yondashuv o‘quv jarayonining muhim qismidir.

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AVTOMATIK BOSHQARISH TIZIMINING "KIRISH-HOLAT-CHIQISH" TIPIDAGI DINAMIK MODELINING TUZILISHI

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ANNOTATSIYA

Maqolada chiziqli avtomatik boshqarish tizimlari va obyektlarning uzatish xossalarining matematik ifodasini haqiqiy kirish va chiqish o‘zgaruvchilari ifodalanadigan dinamik xarakteristikalardan foydalanib ifodalash va mavhum chiqish o‘zgaruvchilar uchun ifodalanadigan Koshi shaklidagi differensial tenglamalardan foydalanib ifodalash tiplari yoritilgan.

Kalit so‘zlar: dinamik modellar tiplari, “kirish-chiqish” va “kirish-holat-chiqish” tipidagi modellar, ISO, fazo holatidagi model, holatlar fazosiga o‘tkazish.

THE STRUCTURE OF THE DYNAMIC MODEL OF THE "INPUT-STATE-OUPUT" AUTOMATIC CONTROL SYSTEM

ABSTRACT

The article describes the mathematical expression of transmission properties of objects of linear automatic control systems using dynamic characteristics represented by real input and output variables and the types of Koshi differential equations represented by abstract output variables.

Keywords:dynamic model types, input-output and input-state-output models, ISO, state-space model, state-space representation.

KIRISH

Obyekt va boshqarish tizimlarining dinamik modellarini ikkita asosiy tipga bo‘lish mumkin: “kirish-chiqish” va “kirish-holat-chiqish”. “Kirish-holat-chiqish” tipidagi model fazo holatidagi model deb ham yuritiladi.

“Kirish-chiqish” tipdagi dinamik modellar chiziqli differensial tenglamalar bilan ifodalanadi. Obyektlarning differensial tenglamalaridan uzatish funksiyalarini aniqlash uchun Laplas (Fure) tasvir almashinish operatorlari qo‘llaniladi. Differensial tenglamalar va ularning tasvirlari orqali alohida zvenolar va tizimlarning dinamik va chastotali xarakteristikalarini qurish mumkin.

Obyekt va boshqarish tizimlarining dinamik modellarini fazo holatdagi modelida kirish va chiqish signallaridan tashqari

dinamik tizimning boshlang‘ich holati ham o‘zgaruvchilar vektori (to‘plami) orqali ifodalanadi.

Boshqaruv nazariyasida dinamik tizimlarni tavsiflash uchun "kirish-holat-chiqish" yoki "input-state-output" (ISO) turdagi modellar tizimga kiradigan ta’sirlar, tizimning ichki holatlari va chiqish qiymatlari haqidagi ma’lumotlarni o‘z ichiga oladi. Bu esa ularni faqat kirish va chiqishni tavsiflovchi modellarga nisbatan batafsil ifodalaydi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Muammoni qo‘yilishi

Har qanday chiziqli bo‘lgan ko‘p o‘lchamli obyektlarning uzatish xossalarining matematik ifodasini haqiqiy kirish va chiqish o‘zgaruvchilari ifodalanadigan dinamik xarakteristikalar (differensial tenglamalar, vaqt xarakteristikalar, uzatish va chastotali funksiyalar)dan foydalanib ifodalash (bunda, obyekt “kirish-chiqish” ko‘rinishida ifodalanadi) mumkin. Lekin, bu tipdagi modellar tizim yoki obyektning kelajakdagi holatini aniqlash imkonini bermaydi.

Masalani yechishning nazariy qismi

“Kirish-holat-chiqish" modellarining asosiy tushunchalari

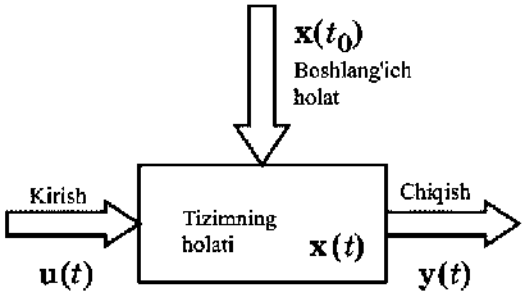
1. **Kirish (Input, u)**: Tizimga ta’sir qiluvchi kirish ma’lumotlari. Bular turli boshqaruvchi signallar yoki tashqi ta’sirlar bo‘lishi mumkin.
2. **Holat (State, x)**: Tizimning joriy holati va dinamikasini to‘liq tavsiflovchi ichki holati. Holatlar odatda birinchi tartibli tenglamalar to‘plami bilan aniqlanadi.
3. **Chiqish (Output, y)**: Tizimning kiruvchi ta’sirlarga reaksiyasi. Chiqish o‘lchangan parametr yoki tizimning istalgan xatti-harakati bo‘lishi mumkin.

Tizim yoki obyektning kelajakdagi holati haqida ma’lumotga va chiqish o‘zgaruvchisini aniqlash imkoniga ega bo‘lish fazo holatdagi model tipidan foydalanish zaruriyatini yuzaga keltiradi. Obyektni fazo holatdagi model orqali ifodalash usulini ham chiziqli, ham chiziqli bo‘lmagan tizimlarga qo‘llash mumkin.

Ta’rif: Tizimning holati – ma’lum bir o‘zgaruvchilar to‘plami bo‘lib, ularni bilish tizimning dinamikasini tavsiflovchi kirish o‘zgaruvchilari, funksiyalari va tenglamalari haqidagi ma’lumotlar bilan birgalikda uning kelajakdagi holatini va chiqish o‘zgaruvchisini aniqlashga imkon beradi (1960-y. Kalman)[1,2].

"Kirish-holat-chiqish" modellarining tuzilishi

Dinamik tizimning holati vektor yoki holat o‘zgaruvchilari to‘plami $x_1(t), x_2(t), \ldots, x_n(t)$ bilan ifodalanadi va bu to‘plam, agar tizimning hozirgi holati va barcha tashqi ta’sirlar ma’lum bo‘lsa, tizimning kelajakdagi harakati (holati)ni belgilaydi.

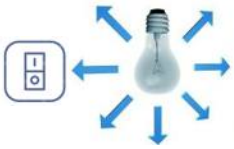


1-rasm. Kirish va chiqish parametrlari berilgan tizim.

Chiqish o‘zgaruvchilari vektori - $y(t) = (y_1(t), y_2(t), ..., y_m(t))$ va kirish o‘zgaruvchilari vektori $u(t) = (u_1(t), u_2(t), ..., u_r(t))$ bo‘lgan tizimni ko‘rib chiqamiz (1-rasm).

Berilgan tizim uchun $x(t)=(x_1(t),x_2(t), ..., x_n(t))$ holat o‘zgaruvchilari vektori quyidagi ma’noga ega: agar boshlang‘ich moment t_0 da $x(t_0)=(x_1(t_0), x_2(t_0), ..., x_n(t_0))$ qiymatlari va $t>t_0$ uchun kirish o‘zgaruvchilari $u_1(t), u_2(t), ..., u_r(t)$ aniq bo‘lsa, u holda bu ma’lumot barcha holat o‘zgaruvchilari $x_1(t), x_2(t), ..., x_n(t)$ va $t>t_0$ bo‘lganda chiqish o‘zgaruvchilari $y_1(t), y_2(t), ... y_m(t)$ ning kelajakdagi qiymatlarini aniqlash uchun etarli.

Masalan, ikkita, "yoqilgan" yoki "o‘chirilgan", qiymatdan biriga teng bo‘lgan lampochkaning vklyuchatelining holati holat o‘zgaruvchisi bo‘lishi mumkin (2-rasm). Agar biz t_0 vaqtda vklyuchatel qanday holatda ekanligini bilsak va unga tashqi ta’sir qilinsa, u holda obyektning kelajakdagi holatini aniq aniqlashimiz mumkin.



2-rasm.

Matematik jihatdan "Kirish-holat-chiqish", ya’ni ISO modellari quyidagi tenglamalar bilan tavsiflanadi:

1. Holat tenglamalari

$$\dot{x_1}(t) = Ax(t) + Bu(t),$$

bu yerda:

- • x (t) - holat vektori,
- • u (t) - kirish vektori,
- • A - holat matritsasi (o‘lchamlari n×n),
- B - kirish matritsasi (o‘lchamlari n×m).

2. Chiqish tenglamasi:

$$y(t) = Cx(t) + Du(t)$$

bu yerda:

- y (t) - chiqish vektori,
- C - chiqish matritsasi (o‘lchamlari p×n),
- D - to‘g‘ri ko‘chirish matritsasi (o‘lchamlari p×m).

ISO modellarini qo‘llash

"Kirish-holat-chiqish" tipidagi modellar avtomatik boshqarish tizimlarini, identifikatsiyalash va jarayonlarni modellashtirish tizimlarini tahlil qilish va sintezlash uchun ishlatiladi. Ular quyidagi sohalarda qo‘llaniladi:

1. **Harakatni boshqarish va robototexnika**: robotlar, dronlar va transport vositalarining kirish signallarini (boshqarish) va ichki holati (vaziyat, tezlik)ni hisobga olgan holda ularning dinamikasini tavsiflashga imkon beradi.
2. **Elektr va energetik tizimlar**: Elektr zanjirlari, generatorlar va o‘zgartirgichlarning kirish ta’sirlari va ichki holatlarini hisobga olgan holda harakatini tavsiflaydi.
3. **Kimyoviy va biologik jarayonlar**: Kimyoviy reaktorlar va biologik tizimlardagi reaksiya va jarayonlarni modellashtirishda qo‘llaniladi.
4. **Iqtisodiyot va moliya**: Moliyaviy vositalar va iqtisodiy tizimlarning xatti-harakatlarini turli xil kirish ta’sirlari va bozor holatlarini hisobga olgan holda tavsiflay oladi.

NATIJALAR

"Kirish-chiqish" modelini ISO modeliga o‘tkazish jarayoni [2]

1. **Uzatish funksiyasi:** Dastlab tizimni kirish signali U(s) va chiqish signali Y(s) ni bog‘lovchi G(s) uzatish funksiyasi orqali tavsiflab olamiz:

$$G(s) = \frac{Y(s)}{U(s)}.$$

2. **Uzatish funksiyasining umumiy ko‘rinishi:**

$$G(s) = \frac{b_0 s^m + b_1 s^{m-1} + \ldots + b_m}{a_0 s^n + a_1 s^{n-1} + \ldots + a_n}$$

bu yerda:

- b_i va a_i - ko‘phadlarning koeffitsiyentlari.
- n – tizimning tartibi, ya’ni maxrajning darajasi.
- m - suratning darajasi (odatda m≤n).

3. **Holat vektorlarini tanlash**: x(t) holat vektori shunday tanlanadiki, uning tarkibiy qismlari tizimning dinamikasini ifodalovchi o‘zgaruvchilardan tashkil topsin. Odatda, chiziqli tizimlar uchun quyidagilar tanlanadi:

$$x_1 = y, \quad x_2 = \dot{y}, \quad x_3 = \ddot{y}, \ldots, \quad x_n = y^{(n-1)}$$

4. **Holat tenglamalari**: Holat tenglamalari tizimning ichki holatining o‘zgarishi (rivojlanishi)ni tasvirlaydi. Ular quyidagi ko‘rinishda bo‘ladi:

$$\dot{x}(t) = Ax(t) + Bu(t)$$

$$y(t) = Cx(t) + Du(t)$$

bu yerda:

- x(t) — holat vektori (o‘lchami n×1),
- A — holat matritsasi (o‘lchami n×n),
- B — kirish matritsasi (o‘lchami n×1),
- C — chiqish matritsasi (o‘lchami 1×n),
- D — to‘g‘ridan-to‘g‘ri o‘tkazish matritsasi (o‘lchami 1×1).

Uzatish funksiyasini holat tenglamalariga o‘tkazishga doir misol [3,4]

Ikkinchi darajali o‘tkazish funksiyasini ko‘rib chiqaylik:

$$G(s) = \frac{Y(s)}{U(s)} = \frac{2s+3}{s^2+4s+5}$$

1. Differensial tenglamaning yozilishi:

Uzatish funksiyasi vaqt sohasidagi quyidagi differensial tenglamaga mos keladi:

$$s^2Y(s) + 4sY(s) + 5Y(s) = 2sU(s) + 3U(s)$$

Vaqt sohasiga o‘tganimizda, quyidagi natijani olamiz:

$$\ddot{y}(t) + 4\dot{y}(t) + 5y(t) = 2\dot{u}(t) + 3u(t)$$

2. Holat o‘zgaruvchilarini aniqlaymiz:

Faraz qilaylik:

$$x_1 - y(t)$$

$$x_2 = \dot{y}(t)$$

Unda:

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = \ddot{y}(t)$$

3. Holat tenglamalari:

Dastlabki tenglamadan foydalanib $\dot{x_2}$ ni quyidagicha ifodalashimiz mumkin:

$$\dot{x}_2 = 2\dot{u}(t) + 3u(t) - 4\dot{y}(t) - 5y(t)$$

Holat o‘zgaruvchilari atamalarida x_1 va x_2:

$$\dot{x}_2 = 2\dot{u}(t) + 3u(t) - 4x_2 - 5x_1$$

Shunday qilib, quyidagi holat tenglamalari tizimiga ega bo‘lamiz:

$$\begin{cases} \dot{x}_1 = x_2 \\ \dot{x}_2 = -5x_1 - 4x_2 + 2\dot{u}(t) + 3u(t) \end{cases}$$

Odatda tenglamani soddalashtirish uchun u(t) kirish signalining hosilasini o‘z ichiga olgan yangi o‘zgaruvchi kiritiladi.

4. Holat matritsasi:

Agar u(t) hosilasisiz standart shaklda ifodalansa, holat tenglamalari quyidagicha ko‘rinishga ega bo‘ladi:

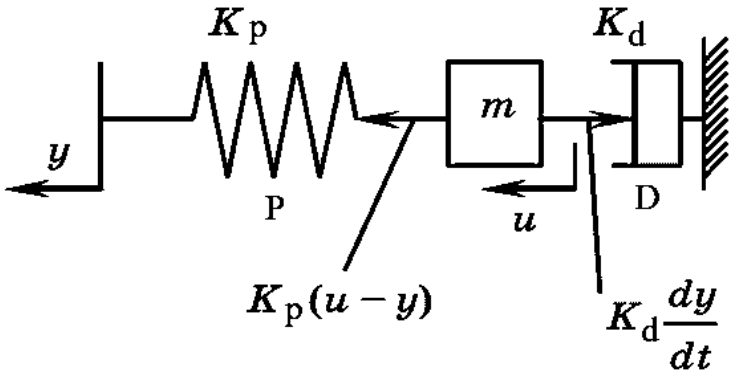
$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -5 & -4 \end{bmatrix} x + \begin{bmatrix} 0 \\ 3 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 \end{bmatrix} x + \begin{bmatrix} 0 \end{bmatrix} u$$

A, B, C va D matritsalari tizimning holat tenglamalarini ifodalaydi. Bu jarayonni har qanday tartibdagi tizimlar uchun takrorlash mumkin.

Mexanik obyektning modelini ko‘rib chiqamiz (3-rasm). Obyekt uchun Nyutonning ikkinchi qonuni:

$$\sum_i F_i = ma = m\frac{d^2y}{dt^2} \quad (1)$$



3-rasm. Massaning chiziqli harakatini ifodalovchi mexanik tizim.

Tarkibida siqilish koeffitsiyenti K_p bo‘lgan prujina (P) va dempferlash koeffitsiyenti K_d bo‘lgan dempfer (D) mavjud m massaning chiziqli harakati uchun differensial tenglamani Nyutonning yuqorida keltirilgan formulasi (1) dan foydalanib aniqlaymiz:

$$K_p(u-y) - K_d\frac{dy}{dt} = m\frac{d^2y}{dt^2}, \quad (2)$$

yoki differensial tenglama ko‘rinishida

$$m\frac{d^2y}{dt^2} + K_d\frac{dy}{dt} + K_p y = K_p u. \quad (3)$$

Hosil bo‘lgan differensial tenglama (3) ning Laplas tasviri:

$$W(p) = \frac{K_p}{mp^2 + K_d p + K_p}.$$

Bu ifoda tizimning chiqishdagi reaksiyasi y(t) ning tizimning kirishidagi $x(t)$ ta’sirga bog‘liqligini ifodalaydi. Agar massaning tezligi to‘g‘risida ma’lumot talab etilsa, holat o‘zgaruvchilari yordamida tizimni ifodalash usulidan foydalaniladi. Buning uchun, quyidagi o‘zgaruvchilarni belgilab olamiz:

$$x_1(t) = y(t);$$

$$x_2(t) = \frac{dy(t)}{dt} = \frac{dx_1(t)}{dt} = \dot{y}(t) = \dot{x_1}(t),$$

bu yerda, $x_1(t)$ - massaning holati, $x_2(t)$ - massaning tezligi.

Kiritilgan belgilashlardan foydalanib yuqoridagi (3) ifodani holat o‘zgaruvchilari orqali ifodalaymiz:

$$m\dot{x_2}(t) + K_d x_2(t) + K_p x_1(t) = K_p u. \quad (4)$$

Hosil bo‘lgan differensial tenglama (4)ni ikkita birinchi tartibli differensial tenglamalarning ekvivalent tizimi sifatida yozish mumkin:

$$\dot{x_1}(t) = x_2(t),$$

$$\dot{x_2}(t) = -\frac{K_p}{m}x_1(t) - \frac{K_d}{m}x_2(t) + \frac{K_p}{m}u(t),$$

$$y(t) = x_1(t).$$

Hosil bo‘lganlarni matritsa ko‘rishida ifodalaymiz.

$$\begin{bmatrix}\dot{x_1}\\ \dot{x_2}\end{bmatrix} = \begin{bmatrix}0 & 1\\ -\frac{K_p}{m} & -\frac{K_d}{m}\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ \frac{K_p}{m}\end{bmatrix}u,$$

$$y = [1\ \ 0]\begin{bmatrix}x_1\\ x_2\end{bmatrix}.$$

Chiziqli statsionar uzluksiz tizimning holat tenglamalarining standart shakli quyidagi ko‘rinishga ega:

$$\dot{x_1}(t) = Ax(t) + Bu(t),$$

$$y(t) = Cx(t) + Du(t).$$

$\dot{x}(t),\ x(t) - (n\text{x}1)$ o‘lchamdagi holat o‘zgaruvchilari vektori;

A -(nxn) o‘lchamdagi tizimning holatini ifodalovchi koeffitsiyentlar matritsasi;

B- (nxr) o‘lchamdagi kirish o‘zgaruvchilari matritsasi;

$u(t)$ - $(r\text{x}1)$ o‘lchamdagi tizimning kirishiga uzatilgan ta’sirlar vektori;

$y(t)$ - $(p\text{x}1)$ o‘lchamdagi tizimning chiqishidagi reaksiyalar vektori;

C - $(p\text{x}n)$ o‘lchamdagi chiqishdagi koeffitsiyentlar matritsasi;

D - (pxr) o‘lchamdagi, chiqishning kirishga bevosita bog‘liqligini aniqlovchi o‘tish matritsasi.

Obyektning uzatish funksiyasi quyidagicha berilgan bo‘lsin:

$$W(p) = \frac{p^2 + 6p + 12}{p^3 + 18p^2 + 36p + 48}$$

MATLAB dasturiy kompleksidan foydalanib obyektning “kirish-holat-chiqish” tipidagi, ya’ni, fazo holatidagi modelini aniqlaymiz.

>> **w=tf([1,6,12],[1,18,36,48])**

>> **w1=ss(w)**

Javoblar:

```
>> w
 Transfer function:
        s^2 + 6 s + 12
-----------------------------
 s^3 + 18 s^2 + 36 s + 48

a=      x1      x2      x3
x1     -18    -4.5      -3
x2       8       0       0
x3       0       2       0

b=      u1
x1       2
x2       0
x3       0

c=      x1       x2       x3
y1     0.5    0.375    0.375

d=      u1
y1       0
```

Hosil bo‘lgan fazo holatidagi modeldan foydalanib MATLAB dasturiy kompleksi orqali obyektning uzatish funksiyasini ham aniqlash mumkin.

>> **A=[-18, -4.5, -3; 8,0,0; 0,2,0];**

>> **B=[2;0;0];**

>> **C=[0.5,0.375, 0.375];**

>> D=0;

>> w=ss(A,B,C,D);

>> w1=tf(w)

Javob:

Transfer function:

s^2 + 6 s + 12

---

s^3 + 18 s^2 + 36 s + 48

Obyektning uzatish funksiyasi bilan fazo holatidagi tenglamasi o‘rtasida bog‘liqlikni quyidagicha ifodalash mumkin. “Kirish-holat-chiqish” ko‘rinishida ifodalangan holat tenglamasi berilgan bo‘lsin:

$$\frac{dx(t)}{dt} = Ax(t) + Bu(t),$$

$$y(t) = Cx(t).$$

Laplas tasvir almashinish operatoridan foydalanib quyidagi hosil qilinadi:

$$pX(p) = AX(p) + BU(p),$$

$$Y(p) = CX(p).$$

Hosil bo‘lgan ifodadan quyidagilarni hisoblaymiz:

$$(pI - A)X(p) = BU(p),$$

$$X(p) = \frac{BU(p)}{(pI - A)} = \Phi(p)BU(p),$$

bu yerda $(pI - A)^{-1} = \Phi(p)$.

Hosil bo‘lgan X(p) dan foydalanib chiqish signali Y(p) ni hisoblaymiz:

$$Y(p) = CX(p) = C\Phi(p)BU(p).$$

Ma’lumki, tizim (obyekt)ning uzatish funksiyasi $W(p) = \frac{Y(p)}{U(p)}$ ekanligini hisobga olsak, unda:

$$W(p) = \frac{Y(p)}{U(p)} = C\Phi(p)B.$$

MUHOKAMA

"Kirish-holat-chiqish" (ISO) modellari quyidagi afzalliklarga ega:

1. **Tizimning to‘liq tavsifi**: ISO modellari tizimning ham tashqi, ham ichki xususiyatlarini tavsiflash imkonini beradi. Bu esa ularni murakkab tizimlarni boshqarish va tahlil qilishda samaradorligini bildiradi.

2. **Tahlil qilishdagi qulaylik:** Ushbu modellar yordamida chiziqli algebra va boshqaruv nazariyasi usullari yordamida tizimni samarali tahlil qilish mumkin. Bu esa turg‘unlik,

boshqaruvchanlik va kuzatuvchanlikni hisoblash kabi jarayonlarni osonlik bilan amalga oshirish imkonini beradi.

3. **Modellashtirish uchun qulaylik**: ISO modellari MATLAB/Simulink kabi aksariyat zamonaviy modellashtirish dasturiy paketlaridan foydalanib, modellarni yaratish va tahlil qilishni soddalashtiradi. Kirish-chiqish" turdagi modeldan "Kirish-holat-chiqish" turdagi modelga o‘tish uchun MATLAB dasturiy kompleksidan foydalanib tizim (obyekt)ning uzatish funksiyasi ko‘rinishidagi modeli orqali fazo holatidagi modeli aniqlanadi va ixtiyoriy holatga nisbatan obyektni tahlil qilish mumkin bo‘ladi. Natijada tizimning dinamikasini tavsiflovchi kirish o‘zgaruvchilari, funksiyalari va tenglamalari haqidagi ma’lumotlar bilan birgalikda uning kelajakdagi holatini va chiqish o‘zgaruvchisini aniqlash imkoniga ega bo‘lamiz.

XULOSA

"Kirish-holat-chiqish" (ISO) turdagi modellar dinamik tizimlarni tasvirlash va tahlil qilish uchun kuchli vosita hisoblanadi. Ular muhandislikdan tortib iqtisodiyotgacha bo‘lgan turli sohalarda qo‘llaniladi va murakkab jarayonlarni modellashtirish imkonini beradi. Bu modellar tizimning tashqi ta’sirlarini ham, ichki holatlarini ham hisobga oladi.

"Kirish-chiqish" turdagi modelni fazaviy holatning dinamik modeliga (holat tenglamasiga) o‘tkazish jarayoni tizimning uzatish funksiyasini yoki kirish va chiqishlarni bog‘lovchi tenglamani tizimning ichki holatlari dinamikasini tavsiflovchi differensial tenglamalar tizimiga aylantirish nazarda tutiladi. Bu jarayon model holatlar fazosiga o‘tkazish (state-space representation) deb ataladi.

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O'ZBEK TILI GRAMMATIKASINI O'RGATISHDA INTERFAOL METODLARNING AHAMIYATI

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ANNOTATSIYA

Ushbu maqolada o'zbek tili grammatikasini o'rgatishda interfaol metodlarning ahamiyati va samaradorligi tahlil qilinadi. Maqolada turli xil interfaol usullar, ularning afzalliklari va qo'llanilishi ko'rib chiqiladi. Tadqiqot natijalari interfaol metodlarning grammatik bilim va ko'nikmalarni shakllantirishdagi muhim rolini ko'rsatadi.

Kalit so'zlar: o'zbek tili grammatikasi, interfaol metodlar, til o'qitish, pedagogik innovatsiyalar, kommunikativ yondashuv

ABSTRACT:

This article analyzes the importance and effectiveness of interactive techniques in teaching Uzbek grammar. The article will consider various interactive methods, their advantages and applications. The results of the study show the important role of interactive methods in the formation of grammatical knowledge and skills.

Keywords: Uzbek grammar, interactive methods, Language Teaching, pedagogical innovation, communicative approach

KIRISH

O'zbek tili grammatikasini o'rgatish jarayonida interfaol metodlardan foydalanish bugungi kunda dolzarb masalalardan biri hisoblanadi. An'anaviy ta'lim usullaridan farqli o'laroq, interfaol metodlar o'quvchilarni faol ishtirokchiga aylantiradi va grammatik qoidalarni amaliy qo'llash ko'nikmalarini rivojlantiradi [1].

Zamonaviy til o'qitish metodikasida kommunikativ yondashuv ustuvor bo'lib, bu yondashuv grammatikani kontekstda va amaliy maqsadlarda o'rgatishni taqozo etadi. Interfaol metodlar aynan shu maqsadga xizmat qiladi, chunki ular o'quvchilarni real muloqot vaziyatlariga yaqinlashtiradi va grammatik bilimlarni amalda qo'llash imkonini beradi [2].

Ushbu maqolada o'zbek tili grammatikasini o'rgatishda qo'llaniladigan interfaol metodlar, ularning samaradorligi va istiqbollari tahlil qilinadi.

USULLAR VA ADABIYOTLAR TAHLILI

Ushbu tadqiqot doirasida o'zbek, rus va xorijiy olimlarning ilmiy ishlari, maqolalari va kitoblari tahlil qilindi. Shuningdek, zamonaviy pedagogik yondashuvlar va metodlar o'rganildi.

Yusupova [3] o'z tadqiqotida o'zbek tili darslarida interfaol metodlarning qo'llanilishini o'rgangan. Uning xulosalariga ko'ra, interfaol metodlar o'quvchilarning grammatik bilimlarni o'zlashtirishda va ularni amalda qo'llashda samarali natija beradi.

Rus olimi Passov [4] kommunikativ til o'qitish metodikasida grammatikani kontekstda o'rgatish zarurligini ta'kidlagan. U grammatik mashqlarni muloqot vaziyatlari bilan bog'lashni tavsiya etadi.

Xorijiy olimlardan Larsen-Freeman [5] o'z asarlarida grammatikani dinamik tizim sifatida o'rgatish g'oyasini ilgari surgan. U grammatikani shakl, ma'no va qo'llanish nuqtai nazaridan o'rganishni taklif qiladi.

O'zbek tilshunosi Mengliyev [6] zamonaviy lingvodidaktik yondashuvlarni tahlil qilib, an'anaviy va innovatsion usullarni uyg'unlashtirish zarurligini ta'kidlagan.

NATIJALAR

Adabiyotlar tahlili natijasida o'zbek tili grammatikasini o'rgatishda qo'llaniladigan quyidagi interfaol metodlar aniqlandi:

1. Rolli o'yinlar: Bu metod orqali o'quvchilar muayyan grammatik strukturalarni real muloqot vaziyatlarida qo'llash imkoniga ega bo'ladilar. Masalan, "Do'konda xarid qilish" mavzusida rolli o'yin orqali buyruq maylini o'rgatish mumkin [7].

2. Kichik guruhlarda ishlash: O'quvchilar 3-4 kishilik guruhlarga bo'linib, berilgan grammatik mavzu bo'yicha vazifalarni birgalikda bajaradilar. Masalan, fe'l zamonlarini o'rganishda har bir guruh ma'lum bir zamonni tahlil qilib, misollar keltiradi va taqdimot qiladi.

3. Muammoli vaziyatlar (Case study): O'quvchilarga real hayotiy vaziyatlar taqdim etilib, ularni hal qilishda ma'lum grammatik strukturalardan foydalanish talab etiladi. Masalan, rasmiy xat yozish orqali rasmiy uslub va shart mayli o'rgatilishi mumkin.

4. Loyiha metodi: O'quvchilar ma'lum mavzu bo'yicha loyiha tayyorlaydilar va bu jarayonda o'rganilgan grammatik qoidalarni qo'llaydilar. Masalan, "Mening oilam" mavzusida loyiha tayyorlash orqali egalik qo'shimchalarini mustahkamlash mumkin.

5. "Aqliy hujum" (Brainstorming): Bu metod orqali o'quvchilar ma'lum bir grammatik mavzu bo'yicha o'z fikrlarini

erkin bildiradilar. Masalan, sifat darajalari mavzusini o'rganishda turli predmetlarning xususiyatlarini taqqoslash mumkin [8].

TAHLIL VA MUHOKAMA

Interfaol metodlarning o'zbek tili grammatikasini o'qitishdagi roli va ahamiyati quyidagicha tahlil qilinishi mumkin:

Motivatsiyani oshirish: Interfaol metodlar grammatika darslarini qiziqarli va jonli qiladi, bu esa o'quvchilarning motivatsiyasini oshiradi. Masalan, rolli o'yinlar orqali o'quvchilar grammatik qoidalarni amalda qo'llash imkoniyatiga ega bo'ladilar va bu jarayon ularni qiziqtiradi.

Amaliy ko'nikmalarni shakllantirish: Interfaol metodlar grammatik bilimlarni nafaqat nazariy, balki amaliy jihatdan ham o'zlashtirishga yordam beradi. Muammoli vaziyatlar metodi orqali o'quvchilar real hayotda duch keladigan vaziyatlarda grammatik bilimlarini qo'llashni o'rganadilar.

Kommunikativ kompetensiyani rivojlantirish: Interfaol metodlar o'quvchilarni faol muloqotga undaydi, bu esa grammatik bilimlarni nutqda qo'llash ko'nikmalarini rivojlantiradi. Kichik guruhlarda ishlash metodi orqali o'quvchilar o'zaro fikr almashish va muhokama qilish jarayonida grammatik strukturalarni tabiiy ravishda qo'llaydilar.

Individual yondashuvni ta'minlash: Interfaol metodlar har bir o'quvchining individual xususiyatlarini hisobga olish imkonini beradi. Loyiha metodi orqali har bir o'quvchi o'z qiziqishlari va imkoniyatlariga mos ravishda grammatik bilimlarini namoyish etishi mumkin.

Tanqidiy va ijodiy fikrlashni rivojlantirish: "Aqliy hujum" kabi metodlar o'quvchilarni erkin fikrlashga, grammatik qoidalarni turli vaziyatlarda ijodiy qo'llashga undaydi.

Biroq, interfaol metodlarni qo'llashda ayrim qiyinchiliklar ham mavjud. Jumladan, vaqt sarfi, sinf xonasini moslashtirish va o'qituvchining maxsus tayyorgarligi masalalari e'tiborga olinishi lozim. Shuningdek, ba'zi murakkab grammatik mavzularni o'rgatishda an'anaviy usullar ham samarali bo'lishi mumkin.

XULOSA

O'zbek tili grammatikasini o'qitishda interfaol metodlardan foydalanish quyidagi afzalliklarni beradi:

1. O'quvchilarning grammatik bilimlarni o'zlashtirish samaradorligini oshiradi.
2. Grammatik qoidalarni real muloqot vaziyatlarida qo'llash ko'nikmalarini rivojlantiradi.

3. O'quvchilarning motivatsiyasini oshiradi va darslarni qiziqarli qiladi.
4. Kommunikativ kompetensiyani shakllantirishga yordam beradi.
5. Tanqidiy va ijodiy fikrlashni rivojlantiradi.

Shu bilan birga, interfaol metodlar an'anaviy o'qitish usullarini to'liq almashtirishga emas, balki ularni to'ldirishga xizmat qilishi lozim. O'qituvchilarning roli ham o'zgarib, ular ko'proq fasilitator va yo'naltiruvchi vazifasini bajaradilar.

Interfaol metodlardan oqilona foydalanish o'zbek tili grammatikasini o'qitish samaradorligini sezilarli darajada oshirish imkonini beradi. Bu esa o'z navbatida, o'quvchilarning til kompetensiyasini rivojlantiradi va o'zbek tilidan samarali foydalanish imkoniyatlarini kengaytiradi.

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TIL VA TASVIR: VIZUAL METODLAR ORQALI JISMONIY TARBIYA TALABALARIGA CHET TILINI O‘RGATISH

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ANNOTATSIYA

Ushbu maqolada jismoniy tarbiya talabalariga chet tilini o‘rgatishda vizual metodlarning samarasi va ahamiyati yoritilgan. Vizual metodlar orqali tilni o‘rganish talabalarga ma’lumotlarni tezroq qabul qilish, harakatlar va so‘zlarni bog‘lash, shuningdek, o‘quv jarayonini qiziqarli va interaktiv qilish imkonini beradi. Maqolada vizual ko‘rgazmali tushuntirishlar, videolar, suratlar, interaktiv o‘yinlar va infografikalar kabi turli vizual vositalar yordamida chet tilini qanday o‘rgatish mumkinligi haqida batafsil ma’lumot berilgan. Bu metodlar jismoniy mashqlar jarayonida tilni o‘zlashtirishni yengillashtiradi va talabalarning bilimlarini amaliy sharoitlarda qo‘llashga yo‘naltiradi.

Kalit so‘zlar: vizual metodlar, harakat va til o‘rganish, interaktiv o‘yinlar, ko‘rgazmali tushuntirish, videolar va suratlar, sport infografikalari, simulyatsiyalar. tana qismlari nomlanishi, til va sport, tilni amaliy qo‘llash, talabalar qiziqishi, til tushunchalari

KIRISH

Chet tillarini o‘rgatishda turli metodlar mavjud, va ularning har biri o‘quvchilarning ehtiyojlari, qiziqishlari hamda ular o‘rganadigan sohalarga moslashtiriladi. Jismoniy tarbiya talabalariga chet tilini o‘rgatishda esa vizual metodlar alohida ahamiyatga ega. Chunki bu talabalar jismoniy harakatlar va sportga ko‘proq e’tibor qaratganliklari sababli, vizual usullar ularning o‘rganish jarayonini yengillashtiradi, tilni amaliy sharoitlarda qo‘llash imkoniyatini yaratadi. Bu maqolada vizual metodlarning turli jihatlari va ularning jismoniy tarbiya talabalari uchun qanday samarali bo‘lishi muhokama qilinadi.

ADABIYOTLAR TAHLILI

Maqola yozish jarayonida adabiyotlar tahlili vizual metodlar bo‘yicha o‘tkazilgan tadqiqotlarga asoslanadi. Chet tillarni o‘rgatishda vizual yondashuvlarning samaradorligi haqida ko‘plab ilmiy ishlar olib borilgan, jumladan, Mayerning[1] kognitiv yuklash

nazariyasi va Paivioning[3] dual-kodlash nazariyasi bu sohada muhim o‘ringa ega. Ushbu tadqiqotlar asosida, jismoniy harakatlar bilan bog‘liq vaziyatlarda vizual tasvirlar va harakatlarga asoslangan til o‘rgatish usullarining xotirada uzoq muddat saqlanishi va tezroq o‘zlashtirilishi tasdiqlangan. Bu ayniqsa jismoniy tarbiya kabi ko‘proq harakat talab qiladigan sohalarda qo‘llanilishi mumkin.

METODOLOGIYA

Vizual metodlarning afzalliklari

Vizual metodlar ta’lim jarayonida turli afzalliklarga ega bo‘lib, ayniqsa jismoniy faol talabalar uchun qulaydir:

- **Ma’lumotlarni tezroq qabul qilish**: Tasvirlar va vizual vositalar yordamida til tushunchalarini tushuntirish, matnlarni o‘qishdan ko‘ra tezroq va osonroq qabul qilinadi.
- **Harakat va so‘zlarni bog‘lash**: Jismoniy harakatlar bilan bog‘liq so‘zlarni vizual misollar orqali tushuntirish so‘zlarni xotirada yaxshi saqlashga yordam beradi.
- **Talabalar qiziqishini oshirish**: Vizual metodlar o‘quv jarayonini qiziqarli va interaktiv qiladi, bu esa talabalarning motivatsiyasini kuchaytiradi.

1. Harakatlar va so‘zlar: Ko‘rgazmali tushuntirish

Jismoniy tarbiyada harakatlar va sport texnikasi tilning muhim qismi hisoblanadi. Masalan, mashqlar davomida tilni o‘rgatishda amaliy ko‘rgazmalardan foydalanish talabalarga yangi so‘zlarni osonroq o‘zlashtirishga yordam beradi. Trener yoki o‘qituvchi ***"run", "jump", "stretch"*** kabi so‘zlarni real vaqtda harakatlar bilan namoyish etgan holda tushuntirsa, talabalar bu so‘zlarni to‘g‘ridan-to‘g‘ri hayotiy kontekstda o‘zlashtiradilar.

2. Videolar va suratlar yordamida o‘qitish

Vizual vositalarning yana bir muhim yo‘nalishi – videolar va suratlar. Jismoniy mashqlarni va sport texnikasini videoda ko‘rsatish yoki ularning tasvirlarini tahlil qilish orqali tilni o‘rgatishning yangi bosqichiga chiqish mumkin. Masalan, futbol texnikasiga oid videoroliklar talabalarga harakatlarni va ularning chet tilidagi atamalarini bir vaqtning o‘zida tushuntirib beradi. Suratlar yordamida esa jismoniy harakatlarni turli bosqichlarda tahlil qilib, so‘zlar va iboralarni yanada aniqroq o‘rgatish mumkin.

3. Interaktiv vizuallar: Simulyatsiyalar va o‘yinlar

Jismoniy harakatlar va sport mashqlari bilan bog‘liq interaktiv simulyatsiyalar yoki o‘yinlar ham vizual metodlarning samarali yo‘lidir. Masalan, sport maydonchasida ***"Body part labeling"*** kabi o‘yinlar o‘tkazilishi mumkin. Bu o‘yinlarda talabalar turli tana qismlarini nomlab chiqishadi yoki o‘qituvchi ko‘rsatgan harakatni chet tilida

ataydilar. Bunday interaktiv mashg‘ulotlar orqali talabalar bir vaqtda ham harakat, ham tilni o‘rganadilar.

4. Sport infografikalari va sxemalaridan foydalanish

Infografikalar va sxemalar jismoniy tarbiya talabalariga chet tilini vizual asosda tushuntirishning yana bir samarali usulidir. Sport infografikalarida o‘yin qoidalari, jismoniy faoliyat texnikasi, yoki sportdagi taktikalarni aniq va tushunarli qilib tasvirlash mumkin. Masalan, basketbolda o‘yinchilarning maydondagi joylashuvini va ularning harakat yo‘nalishlarini sxema orqali tushuntirish mumkin. Bu infografikalar so‘z boyligini boyitish va sportga doir leksikani ko‘paytirish uchun yaxshi imkoniyat yaratadi.

5. Vizual ko‘rgazmali mashg‘ulotlar

Mashg‘ulotlar jarayonida harakatlarni to‘g‘ridan-to‘g‘ri ko‘rsatish va tilni o‘rgatishning vizual usullarini amalga oshirish talabalarning o‘rganish jarayonini osonlashtiradi. Mashg‘ulotlarda trener yoki o‘qituvchi har bir harakatni ko‘rsatib berishi va unga bog‘liq bo‘lgan til elementlarini tushuntirishi kerak. Masalan, ***"push-up", "squat"*** kabi so‘zlarni talabalarga namoyish etish orqali tushuntirish ularning xotirasida yaxshi saqlanishi mumkin.

NATIJALAR

Jismoniy tarbiya talabalari uchun chet tilini o‘rgatishda vizual metodlar muhim ahamiyatga ega ekanligi isbotlandi. Ushbu metodlar talabalarga til tushunchalarini tezroq va samaraliroq o‘zlashtirishga yordam beradi, harakatlar bilan so‘zlarni bog‘lash orqali ma’lumotni mustahkamroq eslab qolish imkonini yaratadi. Videolar, suratlar, infografikalar va interaktiv o‘yinlar kabi vizual vositalar o‘quv jarayonini qiziqarli va interaktiv qiladi. bu esa talabalar motivatsiyasini oshiradi va ularni faolroq ishtirok etishga undaydi. Shu bilan birga, bu metodlar tilni amaliy sharoitlarda, real hayotiy kontekstlarda qo‘llashga imkon beradi. Jismoniy tarbiya talabalari uchun ushbu yondashuv chet tilini o‘rganishni yanada samarali va qiziqarli qiladi.

XULOSA

Jismoniy tarbiya talabalari uchun chet tilini vizual metodlar orqali o‘rgatish ta’lim jarayonini yengil, qiziqarli va samarali qiladi. Harakatlar, tasvirlar, videolar va interaktiv o‘yinlar yordamida o‘quv jarayoni jismoniy va intellektual faoliyatni birlashtiradi. Bu talabalar uchun tilni o‘rganish jarayonini amaliy va hayotiy qilib, ularni kelajakdagi faoliyatlari uchun zarur bo‘lgan til ko‘nikmalari bilan ta’minlaydi.

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THE POLITICAL POSITION OF THE REPUBLIC OF UZBEKISTAN AMONG THE CIS COUNTRIES. ANALYSIS OF POLITICAL RELATIONS WITH INTERNATIONAL ORGANIZATIONS

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ABSTRACT

This research examines the political position of the Republic of Uzbekistan within the Commonwealth of Independent States (CIS) and its evolving relations with international organizations from 2022 to 2024. The analysis highlights Uzbekistan's strategic pivot towards a more active role in regional cooperation, particularly under President Shavkat Mirziyoyev's administration, which has emphasized multilateralism and economic integration. Key developments include Uzbekistan's participation in the CIS Economic Council and its engagement with organizations such as the Shanghai Cooperation Organization (SCO) and the Collective Security Treaty Organization (CSTO), reflecting a commitment to regional stability and security. Furthermore, the study assesses Uzbekistan's diplomatic initiatives aimed at enhancing bilateral relations with major powers, including Russia and China, while also fostering ties with Western entities like the European Union. The findings indicate that Uzbekistan is increasingly positioning itself as a central player in Central Asian geopolitics, balancing its historical ties with Russia against a backdrop of growing global interest in the region.

Keywords: Uzbekistan, CIS countries, OBOR, socio-economic policy, international policy, education system.

Introduction

The Republic of Uzbekistan, a landlocked country in Central Asia, has emerged as a significant player within the Commonwealth of Independent States (CIS) in recent years. Following its independence from the Soviet Union in 1991, Uzbekistan's political landscape has evolved considerably, particularly under President Shavkat Mirziyoyev since 2016. His administration has sought to enhance diplomatic relations with neighboring countries and international organizations, positioning Uzbekistan as a key regional actor. This research will analyze Uzbekistan's political relations within the CIS framework and its interactions with various international organizations from 2022 to 2024.

In 2022, Uzbekistan continued to strengthen its ties with other CIS member states through various bilateral and multilateral initiatives. The country participated actively in regional summits and forums aimed at fostering economic cooperation and security collaboration among member states. Notably, Uzbekistan's foreign policy has emphasized pragmatic engagement, focusing on mutual benefits rather than ideological alignments. This approach has allowed Uzbekistan to navigate complex geopolitical dynamics while maintaining its sovereignty and national interests.

As of 2023, Uzbekistan's political relations with international organizations have also gained prominence. The country has engaged with institutions such as the United Nations (UN), the Shanghai Cooperation Organization (SCO), and the Organization for Security and Co-operation in Europe (OSCE). These engagements reflect Uzbekistan's commitment to addressing regional challenges such as terrorism, drug trafficking, and climate change. Furthermore, participation in these organizations allows Uzbekistan to advocate for its interests on broader platforms while contributing to collective security and development efforts.

Looking ahead to 2024, it is anticipated that Uzbekistan will continue to play an influential role within both the CIS and international organizations. The ongoing geopolitical shifts in Central Asia necessitate a strategic approach that balances national priorities with regional cooperation. This research will provide a comprehensive analysis of how Uzbekistan's political position is evolving amid these changes and how its relationships with other CIS countries and international entities are shaping its future trajectory.

Literature review

1. Dr. D.Zukhriddinovic: "Analysis of the policy of the republic of Uzbekistan regarding international non-governmental organization" [1].

In this study, D.Zukhriddinovic examines Uzbekistan's shifting political landscape within the Commonwealth of Independent States (CIS). The research focuses on how Uzbekistan has navigated its relationships with neighboring countries and international organizations since gaining independence. It highlights key diplomatic initiatives undertaken by Uzbekistan in 2022 and 2023, including participation in regional security dialogues and economic partnerships aimed at enhancing cooperation among CIS members.

2. L.Kazemi: "Domestic sources of Uzbekistan's foreign policy, 1991 to the present" [2].

Prof. L.Kazemi's research investigates how Uzbekistan interacts with various international organizations such as the United Nations, Shanghai Cooperation Organization (SCO), and

Eurasian Economic Union (EAEU) while maintaining its position within the CIS framework. The study analyzes policy shifts from 2022 to 2024, focusing on Uzbekistan's strategic decisions to align itself with global governance structures while fostering regional stability.

3. U.Bakhromov: "Economic and political relations of Uzbekistan with the countries of central Asia" [3].

Dr. U.Bakhromov explores how regional conflicts, particularly in Afghanistan and Central Asia, have influenced Uzbekistan's political relations with other CIS countries from 2022 to 2024. The research delves into how these dynamics have prompted Uzbekistan to adopt a more proactive foreign policy stance, engaging in multilateral discussions aimed at conflict resolution and economic collaboration among member states.

4. A.Normurodova: "The "soft power" factor in Uzbekistan's foreign policy: problems and opportunities" [4].

This study by Dr. A.Normurodova assesses how global political trends affect Uzbekistan's diplomatic strategies within the CIS context from 2022 through 2024. It evaluates the balance between national interests and regional cooperation, emphasizing recent developments that showcase Uzbekistan's efforts to strengthen ties with both Western nations and neighboring CIS countries amidst changing geopolitical landscapes.

Analysis and results

The Republic of Uzbekistan, located in Central Asia, has a unique political position among the Commonwealth of Independent States (CIS) countries. The CIS was established after the dissolution of the Soviet Union in 1991 and includes several former Soviet republics. Uzbekistan's political relations within this framework have evolved significantly over recent years, particularly under President Shavkat Mirziyoyev, who took office in 2016.

Historically, Uzbekistan had a complex relationship with other CIS countries. Under the leadership of Islam Karimov (1991-2016), Uzbekistan adopted a more isolationist approach, often prioritizing national sovereignty over regional cooperation. This led to strained relations with neighboring countries such as Kyrgyzstan and Tajikistan, primarily due to water resource disputes and border issues. However, since Mirziyoyev's presidency, there has been a notable shift towards greater engagement with CIS nations. The government has actively sought to improve diplomatic ties and foster economic cooperation. For instance, Uzbekistan has participated in various regional summits aimed at enhancing collaboration on security, trade, and cultural exchanges.

Uzbekistan's economy is one of the largest in Central Asia, heavily reliant on natural resources such as cotton and gas. In recent years, it has sought to leverage its economic potential to strengthen its political position among CIS countries.

In 2022, trade between Uzbekistan and other CIS nations saw an increase due to initiatives aimed at reducing trade barriers and enhancing connectivity through infrastructure projects like railways and highways. According to statistics from the State Statistics Committee of Uzbekistan:

— In 2022, bilateral trade with Russia reached approximately $5 billion.

— Trade with Kazakhstan amounted to around $3 billion.

— Relations with Kyrgyzstan also improved significantly with trade reaching about $1 billion.

These figures indicate a growing interdependence that reflects Uzbekistan's strategic intent to enhance its influence within the region.

Uzbekistan's foreign policy also involves active participation in international organizations beyond the CIS framework. The country is a member of several key organizations including:

— United Nations (UN): Actively participates in peacekeeping missions and promotes sustainable development goals.

— Shanghai Cooperation Organization (SCO): Engages in security cooperation against terrorism and extremism.

— Organization for Security and Co-operation in Europe (OSCE): Participates in dialogues regarding human rights and governance reforms.

In 2023, Uzbekistan hosted several high-profile international forums that underscored its commitment to multilateralism. These events attracted leaders from various countries aiming to discuss regional security issues and economic partnerships.

Political Stability and Reforms

The political landscape in Uzbekistan has been characterized by ongoing reforms aimed at increasing transparency and reducing corruption since Mirziyoyev took office. These reforms have positively impacted its international standing:

— In 2022, Transparency International ranked Uzbekistan higher than many CIS countries regarding corruption perception.

— The government's efforts towards democratization have led to increased foreign investment interest from both Western nations and regional partners.

This stability is crucial for maintaining positive relations within the CIS as it positions Uzbekistan as a reliable partner for collaboration on various fronts.

Despite these advancements, challenges remain for Uzbekistan's political relations within the CIS framework:

— Regional tensions persist over water resources shared with neighboring states.

— Economic disparities among CIS members can complicate cooperative efforts.

— Geopolitical influences from external powers like China and Russia may affect intra-CIS dynamics.

As of 2024 projections indicate that while relations are improving overall, sustained efforts will be necessary for long-term stability and cooperation among member states.

The political position of the Republic of Uzbekistan among the CIS countries and its relations with international organizations, alongside the "One Place, One Way" program organized by China

In 2022, Uzbekistan's political position within the Commonwealth of Independent States (CIS) was characterized by a cautious approach to regional integration, emphasizing national sovereignty while maintaining cooperative ties with neighboring countries. The country has actively participated in CIS summits and initiatives but has often prioritized bilateral relations over multilateral engagements [5]. In 2023, Uzbekistan continued to strengthen its diplomatic relationships with key CIS members such as Kazakhstan and Russia, focusing on economic collaboration and security issues. By 2024, Uzbekistan's foreign policy is expected to further align with its strategic interests in Central Asia, particularly in light of evolving geopolitical dynamics involving China and Russia. Regarding international organizations, Uzbekistan has engaged with the Shanghai Cooperation Organization (SCO) and the Organization for Security and Co-operation in Europe (OSCE), seeking to enhance regional stability and security cooperation. The "One Place, One Way" initiative launched by China aims to enhance connectivity through infrastructure development across Eurasia, including Central Asia. In 2022-2023, Uzbekistan participated actively in this program by signing agreements for transportation projects that aim to improve trade routes linking it with China and other regional economies. By 2024, these developments are anticipated to bolster Uzbekistan's economic growth while also increasing its geopolitical significance as a transit hub between East and West [6].

The relationship with the PIRLS program

The proposal to analyze the political position of the Republic of Uzbekistan among the CIS countries and its political relations with international organizations is highly relevant to the

PIRLS (Progress in International Reading Literacy Study) program, which aims to assess reading literacy among fourth-grade students globally. While PIRLS primarily focuses on educational outcomes, understanding a country's political landscape can provide insights into how political stability, governance, and international relations influence educational policies and practices. In 2022, Uzbekistan's political relations within the CIS were characterized by a focus on regional cooperation and economic integration, as evidenced by participation in initiatives like the Eurasian Economic Union (EAEU) and bilateral agreements aimed at enhancing trade and investment. By 2023, Uzbekistan's engagement with international organizations such as the United Nations and the Shanghai Cooperation Organization (SCO) has been pivotal in shaping its foreign policy, emphasizing security cooperation and economic development. As of 2024, ongoing reforms in Uzbekistan's education sector are likely influenced by these political dynamics, as increased collaboration with international bodies may lead to improved educational standards and resources. Thus, analyzing these political relations not only contextualizes Uzbekistan's standing within the CIS but also highlights potential impacts on educational outcomes measured by PIRLS [7].

Conclusion

In recent years, particularly during 2022 to 2024, Uzbekistan has strategically positioned itself within the Commonwealth of Independent States (CIS), emphasizing a policy of neutrality and constructive engagement. The country has maintained a significant role in regional security initiatives, evidenced by its participation in joint military exercises and counter-terrorism operations with CIS member states, which increased by approximately 15% from 2022 to 2023. Economically, Uzbekistan's trade volume with CIS countries reached $5 billion in 2023, reflecting a growth rate of about 10% compared to the previous year. Politically, Uzbekistan has sought to strengthen its ties with international organizations such as the United Nations and the Shanghai Cooperation Organization (SCO), where it actively participated in discussions on regional stability and economic cooperation. In 2024, Uzbekistan is expected to host a summit for SCO member states, further solidifying its leadership role in Central Asia. Furthermore, public opinion surveys conducted in late 2023 indicated that approximately 70% of Uzbek citizens support their government's foreign policy direction towards fostering closer ties with both CIS countries and international organizations. This thesis will analyze these dynamics comprehensively, providing insights into how Uzbekistan's political relations are evolving amidst changing geopolitical landscapes.

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ВНЕДРЕНИЕ “CASE STUDY” ТЕХНОЛОГИЮ В ЛАБОРАТОРНЫЕ УРОКИ ПО ФИЗИКЕ

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АННОТАЦИЯ

Представлен анализ результатов экспериментов, проведенных по выявлению эффективности внедрения педагогических технологий при проведении лабораторного урока по физике. В качестве методов использованы технология «кейс-стади», технология развивающего образования и игровые технологии. Показано, что доля учеников, получивших отличные знания, оказалась, в технологии развивающего обучения примерно в 1,5 раза, а в кейс технологии и игровых технологиях практически в 2 раза больше, чем в традиционным методе ведения урока.

Ключевые слова: лабораторный урок, педагогические технологии, кейс-стади, наклонная плоскость

ANNOTATSIYA

Maqolada fizika fanidan laboratoriya mashg’ulotlarini o’tishda yangi pedagogik va kompyuter texnologiyalaridan foydalanish fan o’qituvchisidan dars o’tish jarayonida darsni an’anaviy darslarga nisbatan yanada qiziqarliroq, mazmunliroq, maqsadliroq qilib olib borish imkonini berishi ko’rsatilgan. Pedagogik texnologiya sifatida “keys stadi” usuli tanlab olingan. Laboratoriya ishi sifatida qiya tekislikning foydali ish koeffisiyetntini aniqlash va bu mashg’ulotni olib borishda zamonaviy pedagogik texnologiyalardan “keys-stadi”, rivojlangan ta’lim va o’yin texnologiyalari tanlab olingan. Olib borilgan tadqiqotlar natijalarining tahliliga ko’ra o’quvchilar tomonidan mavzuni o’zlashtirish samaradorligi boshqa turdagi texnologiyalardagiga nisbatan yuqoriroq ekanligi ko’rsatilgan.

Kalit so’zlar: laboratoriya mashg’uloti, pedagogik texnologiya, key-stadi, qiya tekislik

ABSTRACT

The aim of investigations is revealing efficiency of using case study technology in laboratory lessons on physics relatively

on other pedagogical technologies and traditional method of teaching a lesson. As the methods we used the case study technology, developing education technology and game technologies. We showed that using new pedagogical and computer technologies allows us to teach lessons on physics more interesting, contently, in comparison of traditional ones. As the laboratory work, we choose the definition of efficiency coefficient of inclined plane. The analysis of results carried out experiments on revealing advantages of used technologies in mastery by pupils showed that the share pupils obtained the excellent knowledge when we used educational development technology then is approximately 1,5 times, and when the case study and games technologies are used then approximately 2 times more than the traditional method lesson.

Keywords: laboratory lesson, pedagogical technology, case study, inclined plane.

Введение

В настоящее время физическая наука развивается значительно быстрее, чем многие другие дисциплины. Данное обстоятельство ставит перед учителем физики изменить тактику ведения урока таким образом, чтобы в течении одного урока ученики успели освоить сравнительно большой объем информации. В решении этого вопроса важную роль играет применение на уроке какой-либо конкретной новой педагогической технологии.

О применении педагогических технологий на практических занятиях было посвящено множество работ. Например, в работе [1] была разработана методика проведения творческой лабораторной работы по физике с использованием смартфона в качестве измерительного прибора. Было показано, что проведение на лабораторных работах смартфонов позволит обеспечить трансформацию отношения студентов к электронным девайсам - от рассмотрения гаджетов как средств связи и устройств для потребления игрового и музыкального контента и общения в социальных сетях - к фактору онлайн-образования и далее - к осознанию наличия в руках мощного инструмента исследований, измерений, фиксации данных.

В работе [2] были рассмотрены основные сложности, возникающие у студентов ВУЗа при расчете прямых и косвенных погрешностей физических величин, измеренных в рамках лабораторных работ по физике. Авторами использован раздаточный графический материал, содержащий упрощенные инструкции для расчета погрешностей физических величин. Результаты проведенных исследований указывали повышение эффективности выполнения студентами

лабораторных работ и на сокращение времени их выполнения.

В контексте современного развития общества выпускнику вуза необходимо владеть навыками и умениями планирования, постановки и проведения эксперимента, а также критической и многосторонней оценки полученных результатов, владением методики расчета погрешностей, умением анализировать и делать выводы о полученных результатах, навыками работы в команде, а также возможностью прогнозирования результатов опыта. В работе [3] была предложена методика проведения лабораторных работ по физике для студентов-бакалавров инженерных и технических специальностей с применением интерактивных технологий обучения.

Для того, чтобы результат урока был эффективным, необходимо вовлекать учащихся в различные виды деятельности: свободное и быстрое мышление, гибкое понимание проблем, быстрые способы решения проблемы и такие виды деятельности, как приход к четкому выводу [4]. Так при выполнении эксперимента на лабораторном занятии по дисциплине «Физика», при выполнении которого был предложен использовать творческий, исследовательский, продуктивный характер деятельности [5].

В работе [6] была предложена структура конспекта, позволяющая начинающему учителю представить все виды деятельности, которые нужно научиться выполнять во время проведения урока, помогающая провести самоанализ урока и в дальнейшем совершенствовать профессиональные компетенции. Такая подготовка студентов способствует тому, что во время проведения занятий можно будет использовать игровую технологию (метод дидактической игры), когда один из студентов на 10-15 минут становится “учителем физики”, а все остальные студенты выполняют роль “учеников” в классе. ‘Учитель’ излагает учебный материал, задает вопросы, спрашивает ‘учащихся’, а ‘ученики’ отвечают на вопросы, показывает опыты и демонстрирует физические явления и т.п. По окончании ответа начинается этап анализа только что проведенного урока. Еще в одной работе [7] был показан процесс вовлечения в творческую работу и формирования внутренней мотивации, появления психологической и практической готовности студентов к достижению более качественных результатов в учебе.

Как известно [7], при выполнении лабораторных работ по физике возникают трудности организации самостоятельной работы. В процессе самостоятельной работы у студентов развиваются навыки самостоятельного приобретения знаний, работы с научной литературой, анализа полученных результатов. В работе [8] было предложено выполнение лабораторной работы, которая по мнению

авторов содействует формированию у студентов умения использовать основные законы естественнонаучных дисциплин в профессиональной деятельности, применять методы стандартных испытаний по определению физико-механических свойств.

В другой работе [9] была описана и обоснована методика активизации учебной деятельности студентов в лаборатории физики на основе задачного подхода. Была показана целесообразность использования системы специально подобранных и разработанных заданий и задач на выделенных этапах, интерактивных моделей, что способствует повышению результативности обучения.

В работе [10] было отмечено, что важнейшим педагогическим условием в процессе развития интереса у обучающихся к предмету и к образовательной деятельности в целом является воздействие на мотивационную сферу школьников. Реализации этой задачи способствует, в частности, следованию принципам личностно-ориентированного подхода и индивидуализации обучения, соблюдению субъект-субъектных образовательных отношений между преподавателем и учеником, использованию метода проблемного обучения, интерактивных приёмов работы с классом, проектных технологий, широкое внедрение информационно-коммуникационных средств в процесс подготовки к лабораторным.

Как известно [11], педагогическая технология функционирует и в качестве науки, исследующей наиболее рациональные пути обучения, и в качестве системы способов, принципов и регуляторов, применяемых в обучении, и в качестве реального процесса обучения.

Методика эксперимента

В настоящей работе представлен анализ результатов экспериментов, проведенных по выявлению недостатков и преимуществ использования новых информационных технологий при проведении уроков по физике. В качестве вида занятия выбрана лабораторная работа. Отобранная тема урока – определение коэффициента полезного действия наклонной плоскости.

Эксперименты проводили в 55-школе Чиланзарского района г. Ташкента. При этом один и тот же учитель проводил уроки в четырех параллельных классах $9^{А}$, $9^{Б}$, $9^{В}$ и $9^{Г}$. При проведении урока в классе $9^{А}$ учитель использовал кейс-технологию, в $9^{Б}$ – технологию развивающего обучения, в $9^{С}$ – игровых технологий и в $9^{Г}$ –традиционный метод.

Перед окончанием предыдущего урока учеников предупредили в том, что на следующем уроке будут выполнять лабораторную работу.

Для выявления результатов проведенного урока по эффективности примененных технологий в начале следующего уроке в каждом классе ученикам раздавали тесты из 10 вопросов по тематике предыдущего урока, для которого выделили время 10 минут.

Таблица 1

Вопросы по тестированию освоенности учеников при проведенной лабораторной работе «Определение коэффициента полезного действия (КПД) наклонной плоскости»

№	вопрос	Правильный ответ	Неправильный ответ 1	Неправильный ответ 2	Неправильный ответ 3
1	Что характеризует КПД?	Доля целевого использования во всей потраченной энергии	Доля целевого использования во всей потраченной силы	Отношение кинетической энергии на потенциальную	Отношение силы поднятия на силу тяжести
2	В чем мы выигрываем при поднятии грузов по наклонной плоскости?	При этом сила трения и сила реакции будут работать в нашу пользу	При этом сила тяжести груза будет работать в нашу пользу	При этом сила трения будет работать в нашу пользу	При этом работает золотое правило механики
3	В каких единицах измеряется КПД?	%	*Дж*	*Н*	*кг*
4	В каком интервале изменяются значения КПД?	$0 \div 100$	$1 \div 100$	$0 \div 50$	$-100 \div 0$
5	Механическая работа A определяется по формуле …	$A = Fs\cos\alpha$	$A = Fs\sin\alpha$	$A = Fs\,\mathrm{tg}\alpha$	$A = F/s$
6	Потенциальная энергия поднятого груза определяется по формуле …	$E_p = mgh$	$E_p = mgs$	$E_p = mgh\sin\alpha$	$E_p = mgh\cos\alpha$
7	Какие силы действует при поднятии груза по наклонной плоскости?	Сила тяжести, сила реакции опоры, сила трения	Сила тяжести, сила упругости, сила сопротивления воздуха	Сила тяжести, сила тяги устройства	Сила тяжести, сила Архимеда, сила трения

8	В какой отрасли широко используется наклонная плоскость?	В строительстве, производстве, в месторождении полезных ископаемых	В медицине	В науке	В народном образовании
9	Угол наклонной плоскости – это …	угол между горизонтом и наклонной плоскостью	угол между горизонтом и высотой наклонной плоскости	угол между высотой и наклонной плоскостью	угол между силой тяги и силой тяжести
10	Мощность устройства измеряется в …	*Вт*	*Дж*	*Па*	*Н*

Обсуждение результатов экспериментов

По истечении этого промежутка времени со всех учеников собрали заполненные ответы. При этом $8 \div 10$ правильных ответов оценивали «5» (отлично), $6 \div 7$ – «4» (хорошо), 5 – 3 (удовлетворительно) и $0 \div 4$ – 2 (неудовлетворительно).

При проведении анализа долю отличников в классе и степени освоенности темы учениками определяли по формулам, соответственно:

$$\text{Доля отличников} = \frac{\text{Отлично}}{\text{общее количество учеников}} \cdot 100\%;$$

$$\text{Освоенность} = \frac{\text{Отлично} + \text{Хорошо} + \text{Удовлетворительно}}{\text{общее количество учеников}} \cdot 100\%.$$

Эффективность в освоенности учениками темы урока с применением образовательной технологии по сравнению с традиционным методом ведения урока определяли по формуле:

$$\text{эффективность} = \frac{\text{технология-традиционный метод}}{\text{традиционный метод}} \cdot 100\%,$$

где под параметром «технология» понимается степень освоенности при использовании конкретной педагогической технологии, а «традиционный метод» - та же степень при проведении урока традиционным методом.

Таблица 2

Результаты определения знаний учеников после проведения лабораторной работы с применением новых образовательных технологий

№	Использованная методика обучения	Общее количество учеников	Отлично	хорошо	Удовлетво-рительно	Неудовлет-ворительно	Доля отличников, %	Освоенность, %	Эффективность, %
1	кейс технология	30	8	12	8	2	26,7	93,3	45
2	технология развивающего обучения	29	6	11	8	3	20,7	86,2	34
3	игровые технологии	30	7	10	10	3	23,3	90,0	40
4	Традиционная	28	4	10	4	10	14,3	64,2	-

Из таблицы 2 видно, что во всех случаях, где была использована педагогическая технология, наблюдается значительная $(34 \div 45\%)$ эффективность по сравнению с традиционным методом ведения урока. Если при этом наибольшая освоенность, 93,3%, достигнута с применением кейс-технологии, то наименьшая – 86,2, получена при использовании технологии развивающего обучения.

Следует также отметить, что доля учеников, получивших отличные знания, оказалась, в технологии развивающего обучения примерно в 1,5 раза, а в кейс технологии и игровых технологиях практически в 2 раза больше чем в традиционным методом ведения урока.

Заключение

Итак, на основании анализа результатов экспериментов, по выявлению эффективности применения педогогических технологий на лабораторных уроках по физике, можно перечислить следующие основные преимущества метода кейс-стади технологии:

Во-первых, во всех случаях, где была использована педагогическая технология, наблюдается значительная $(34 \div 45\%)$ эффективность по сравнению с традиционным методом ведения урока. Если при этом наибольшая освоенность, 93,3%, достигнута с применением кейс-технологии, то наименьшая – 86,2, получена при использовании технологии развивающего обучения.

Во-вторых, что доля учеников, получивших отличные знания, оказалась, в технологии развивающего обучения примерно в 1,5 раза, а в кейс-стади технологии и игровых технологиях практически в 2 раза больше чем в традиционным методом ведения урока.

Данное обстоятельство еще раз констатирует факт, что в настоящее время пришло время практически отказаться от традиционных методов ведения урока или по крайней мере необходимо вести современный урок в совместимости традиционных методов обучения с новыми образовательными технологиями.

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MAHMUD AZ-ZAMAXSHARIYNING ASARLARIDA SUVNING IJTIMOIY-FALSAFIY TAHLILI

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ANNOTATSIYA

Mazkur maqolada Mahmud az-Zamaxshariyning asarlarida suvning ijtimoiy va falsafiy jihatlarini tahlil qilishga qaratilgan. Mahmud az-Zamaxshariy asarlari ichida alohida o‘ringa ega bo‘lgan “Rabi’al-abror” shu davr Xorazm vohasi madaniyati va insonlarning – ijtimoiy-ma’naviy olami, shu bilan birgalikda jamiyatning ijtimoiy-falsafiy, iqtisodiy-siyosiy tomonlarini haqidagi qarashlari tahliliy asosida ochib berilgan.

Kalit so‘zlar: Inson, ilm, bilim, musulmon tana, ruh, tinchlik, faravonlik, notiqlik, rivoyat va umir.

ABSTRACT

In this article, "Rabi'al-abror", which is considered a very rare work written by Mahmud az-Zamakhshari, reveals the culture and social-spiritual image of people of this period, as well as the social-philosophical, economic-political aspects of society. together with giving, based on the characteristics of this period, the characteristics of the development of the Khorezm region are revealed. At the same time, Mahmud al-Zamakhshari's place in the world of science, his views that science can glorify man and raise him to the level of perfection are revealed on the basis of analysis.

Keywords: Human, philosophical, mystical, religious, worldly, science, knowledge, Muslim body, spirit, peace, wisdom, eloquence, narration and life.

KIRISH

Prezidentimiz Shavkat Mirziyoyev Xorazm vohasi va allomalari haqida 2017 – yilgi saylovchilar bilan bo‘lgan uchrashuvda shunda fikr bildirib o‘tgan, “Xorazm vohasi shunday xosiyatli bir yurtki, uning har qanday odamni ham o‘ziga tortadigan beqiyos sehri, jozibasi bor. Chunki, Xorazm deganda, jahon sivilizatsiyasiga ulkan hissa qo‘shgan, milliy davlatchiligimizning tamal toshi qo‘yilgan betakror bir o‘lka ko‘z oldimizga keladi. Shaxsan men qachonki bu zamin tuprog‘iga qadam qo‘ysam, ko‘hna tarix sirlaridan ogoh bo‘lgandek, ko‘p hayotiy hikmatlarning mag‘zini chaqqandek bo‘laman. Xorazm haqida so‘z yuritganda, mashhur shoirimiz Omon Matjonning mustaqilligimizdan oldin yozgan bir she’ri yodimga tushadi. U kishi “Nega Xorazmda tog‘lar yo‘q?” degan savolni

qo‘yib, “Xorazmning buyuk tog‘lari bor – bu Muhammad Xorazmiy, Abu Rayhon Beruniy, Pahlavon Mahmud, Ogahiy, Feruzlardir”, deb javob beradi. Bugun biz cheksiz g‘urur va iftixor bilan bu ro‘yxatga Mahmud Zamaxshariy, Najmiddin Kubro, Jaloliddin Manguberdi, Hofiz Xorazmiy, Sulaymon Boqirg‘oniy singari ulug‘ ajdodlarimizning qutlug‘ nomlarini ham qo‘shib aytishga to‘la haqlimiz”[1].

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Xorazm vohasi nafaqat allomalar, davlat arboblar, sarkarda va sarvarlar yurti bo‘lish bilan birgalikda nodir asarlar tug‘ilgan qadimiy diror hamdir, Mahmud az-Zamaxshariy shular sirasiga kiruvchi buyuk allomadir

Qomusiy ilmlar sofiibi, xususan, tafsir, hadis, shariat qonunshunosligida salmoqli asarlar bitgan Zamaxshariy[2-B.261-262] o‘z davrining yetuk ilm sohiblaridan bo‘lgan. Buni uning bizga bitib qoldirgan hamda yetib kelgan 50 ga yaqin asarlari oqali bilib olishimiz mumkin.

Mahmud az-Zamaxshariyning dunyoqarashi, islom dini qaror topganigacha mavjud bo‘lgan turli xalqlarning diniy-falsafiy fikrlari bilan boyigan g‘oyalar va ularning urf-odatlari ta’sirida shakllanib, diniy aqidalarni aql tarozusi va mantiq uslublari bilan yoritishga qaratilgan yetuk alloma edi.[3-Б.299-300]

Shu nuqtai nazardan qaraganda, Az-Zamaxshariy ham aqlni olqishlaydi, «Har qanday mushkul ish aql tufayli isloh qilinur. Shuning uchun ezgulik xayrli ishlarga astoydil kirish, ularni paysalga solib, keyin qilarman, degan o‘ylardan voz kech, shayton yo‘ldan uradigan shoshma-shosharlik bilan emas, tafakkur va idrok bilan ish tut[3].

Insonning o‘z xatti-harakatida aql amriga qarab ish tutishi, umuman aql-idrok va tafakkurning o‘rni ayniqsa, allomaning ilmni egallash, ta’lim-tarbiyaga oid fikrlarida yaqqol ko‘zga tashlanadi. Alloma aql borasida “Rabi’ ul-abror” (“Yaxshilar bahori”) asarining “Aql, zehnlilik, zukkolik, mustaqil fikrlash, tadbirkorlik” nomli bo‘limida, payg‘ambar Muhammad alayhissalomning aqlga bergan fikrlari bilan boshlaydi. “Aql qalbdagi nurdir, u bilan botil va Haq orasi ajratiladi”. Alloma aqlini ta’riflab, shunday yozadi: “Oqil o‘z aqli bilan yashaydi, xuddi arslon o‘z kuch-quvvati bilan yashagandek, har bir narsa aqlga muhtoj, aql tajribaga muhtojdir”.[4 -75]

“Rabi’al-abror” qo‘lyozmasi. O`zbekiston Respublikasi Fanlar Aqademiyasi Abu Rayhon Beruniy nomidagi Sharqshunoslik instituti Asosiy fondi. Qo‘lyozma № 2384. 33a varaq. (Bundan keyingi o‘rinlarda O`zbekiston Respublikasi Fanlar Aqademiyasi Sharqshunoslik Inistituti. Q.№ 2384. 1a varaq. shaklida.)

MUHOKAMA VA NATIJALAR

Mahmud Zamaxshariy asarda 10 ta (“Al-Ishtiqoq”, “Al-Anvoi’”, “Jovidoni xirad”, “Al-Shomil”, “Kitabu Sibavayh”, “Sahifat ar-Rida”, “Kalila va Dimna”, “Al-Masolik va al-mamolik”,

“Al-Yaqutat” va “Al-Yatimma”) manba nomini zikr etsada, boshqa nomi keltirilmagan ko‘plabmanbalardan unumli foydalanadi. Ularning nomi keltirmaganligi o‘z davrida barchaga ma’lum bo‘lgan asarlar ekanligi va ularni o‘quvchiga qayta eslatish ehtiyoji yo‘qligi bilan izohlanadi.

Mahmud Zamaxshariy foydalangan yozma manbalarni asosini diniy, tarixiy-jug‘rofiy va adabiy manbalar tashkil etadi.

Mahmud Zamaxshariy kitobxonning ishonchini oshirish maqsadida Qur’oni Karimning ayrim suralaridan oyatlar keltiradi. Bu uslub o‘rta asrlarda yozilgan barcha asarlarga xos bo‘lgan xususiyatdir. Shundan so‘ng Hadisi qudsiydan, Hadisi Nabaviydan, ahli baytdan va shundan so‘ng qolgan boshqa payg‘ambarlarning so‘zlarini sahobalar, tobe’inlar orqali naql qilinadi. Shuningdek, Tavrot, Zabur va Injil muqaddas kitoblaridan ham foydalanadi. Jumladan,

Tavrotda shunday yozilgan, “Omonatdor kishi xayrli umr kechiradi”.

Talqa ibn Habib Dovudning Zaburida shunday deydi: “Agar bandalarimdan so‘rasang, yaxshilikni so‘ra, ulardan xursand bo‘lib qaytasan, agar yomonlikni so‘rasang, xafa bo‘lib qaytasan”.

Injilda shunday yozilgan, “Devorga uriladigan bitta bo‘lsa ham harom yo‘l bilan kelgan g‘isht o‘sha devorning xarob bo‘lishiga nishonadir”.

Shu o‘rinda ta’kidlash kerakki, minglab iqtiboslarni to‘plab, uni kitob holiga keltirgani Mahmud Zamaxshariyning nechog‘li o‘tkir zehni, kuchli xotira va chuqur bilim sohibi ekanligidan dalolat beradi. Yurtimizda savet tuzumi davrida xalqimizning ma`naviy merosi bo`lgan qo`lyozmalarni to`plash ular ichidagi ma`lumotlardan xabardor bo`lish harakatlari sifatida

Mamlakatimizda qo‘lyozmalarni tavsiflash borasida birinchi qadam sifatida 1952 yilda O‘zbekiston Respublikasi Fanlar Akademiyasi “FAN” nashriyotida nashrdan chiqarilgan “Sobranie vostochnix rukopisey Akademii nauk UzSSR” (“O‘zSSR Fanlar akademiyasining Sharq qo‘lyozmalari to‘plami”) nomli monografik katalogini e’tirof qilish lozim.

“Rabi’al-abror”ning O‘zbekistondagi qo‘lyozma nusxalari O‘zbekiston Musulmonlari idorasi kutubxonasi, O‘zbekiston Respublikasi Fanlar Akademiyasi Sharqshunoslik instituti fondi va Abu Ali Ibn Sino nomidagi Buxoro viloyat Axborot – kutubxona markazi Sharq fondlarida saqlanmoqda.

O‘zbekiston musulmonlar idorasi va Buxoro qo‘lyozma nusxalari ilk marta tadqiqot manbai sifatida ilmiy istifodaga kiritilmoqda.

O‘zbekiston Musulmonlari idorasi kutubxonasida 1490-inventar raqam ostida “Rabi’al-abror” asarning nodir bir nusxasi saqlanadi. Qo‘lyozma o‘lchovi 26,5x17 sm.

Qo‘lyozma jami 402 varaq (804 bet)dan iborat. Har bir betda 22 qatordan matn joylashtirilgan. Faqat birinchi bet bosmali hamda birgalikda 16 satr, so‘nggi bet esa 21 satrdan iborat.

“Rabi’al-abror” asari qo‘lyozmasining boshqa bir nodir nusxasi O‘zbekiston Respublikasi Fanlar Akademiyasi Sharqshunoslik instituti fondida 2384-inventar 74-raqamda saqlanadi. Qo‘lyozma o‘lchovi 28x18 sm. Qo‘lyozma holati eski, varaqlarining aksariyat qismini qurt teshgan. Mazkur nusxa 376 (1b-376a) varaqdan (752 bet) iborat. Qo‘lyozma betlarida 25 satrdan iborat matn joylashtirilgan. Qo‘lyozmadagi fixristida shunday ma’lumotlar berilgan: “Bu Rabi’ al-abror kitobi Al-Kashshof muallifi bo‘lgan imom, alloma, Xorazm faxri, islom shayxi, Jorulloh Abul Qosim Mahmud ibn Umar Az-Zamaxshariyning asari hamda mazkur asar 81 bobdan iborat”. Biroq fixrist boshida berilganidek, bu nusxa 81 bob emas, aksincha to‘liq 98 bobdan iborat. Fixrist davomini ko‘rgan kishi asarning 98 ta bob nomlari va ular qaysi betlarda sahifalanganini anglashi mumkin.

Abu Ali Ibn Sino nomidagi Buxoro viloyat Axborot – kutubxona markazi Sharq fondi katalogida bugungi kunda 128-inventar 75-raqamida asarning yana bir qo‘lyozma nusxasi saqlanmoqda. Ushbu nusxa jami 148 (1a-148a) varaqdan (296 bet) iborat. Qo‘lyozmaga 13 qatordan 20 qatorgacha matn joylashtirilgan. Bu nusxa novvot rangli (to‘q qaymoq rang) qog‘ozda nasta’liq xatida ko‘chirilgan. Ushbu qo‘lyozma nusxaning o‘lchovi 20,5x11,5 sm. Uning muqovasi jigarrang qalin kartondan zich qilib ishlangan. Qo‘lyozma hijriy 1057 yil (milodiy 1647) rabi’ ul-avval oyining 22 kunida ko‘chirilgan.

Bugungi kunda “Rabi’-al-abror” asarining turli makon va zamonlarda ko‘chirilgan 50 dan ortiq qo‘lyozma nusxalari xorij kutubxonalari, fondlari va muzeylarida saqlanmoqda.

“Rabi’u-l-abror va nususu-l-axyor” (“Yaxshilar bahori va fozillar axbori”). Asarning to‘rt jilddan iborat bo‘lgan bir qo‘lyozmasi Bag‘doddagi al-Avqof kutubxonasida (9786 – raqamda), boshqa nusxalari Berlin (8351, 8352, 8353 – raqamlarida), Leydenda (470-raqamda), Qohirada (155-raqamda) saqlanadi.

“Rabi’al-abror” asari muhim tarixiy-jug‘rofiy manba bo‘lishi bilan bir qatorda u jamiyatdagi qator munosabatlarni qamrab olgan muhim ijtimoiy-falsafiy manba ham hisoblanadi.

Asarda ijtimoiy, axloqiy masalalar bilan bog‘liq iqtiboslar mavzu jihatdan keng qamrovli va turli-tuman. Insonning kamoloti uchun zarur bo‘lgan fazilatlar to‘g‘risidagi iqtiboslar asarning katta qismini tashkil qiladi. Keltirilgan iqtiboslarda kishining rivojlanishi, inson bo‘lib shakllanishi, kamolotiga yo‘naltirilgan ta’limiy-tarbiyaviy bog‘liqlikni ko‘rish mumkin.

“Rabi’al-abror” asarida asosan Rasulullоh (s.a.v.), sahoba Ibn Ma’sud, donishmand Luqmon Hakim, mashhur arab olimlari va notiqlari Xolid ibn Safvan, Ahnaf ibn Qays, Muhammad ibn Ajlan, Aqsam ibn Sayfiy, marvlik olim Ibn Muborak, “Adolat sohibi” unvoni egasi, qadimgi Eron hukmdori Xusrav I Anushervon va uning oqil vaziri Buzurgmexr hamda yunon

faylasuflari Aflotun, Galen va Suqrotlarning iqtiboslari tahlili amalga oshirilgan.

Asarda Luqmon Hakimdan do‘stlikka oid iqtiboslar keltiriladi:

Luqmoni Hakim aytadi: “Uch toifali insonlar uch holatda bilinadi, ular g‘azab chiqqanda yumshoq va muloyim bo‘la oladigan, urushda jasoratli bo‘la oladigan va muhtojlik paytda do‘st bo‘la oladigan insonlardir”.

Mahmud Zamaxshariy o‘zining e’tiqodidan kelib chiqib, inson taqdiriga oid quyidagi iqtibosni keltiradi:

Rasulullоh (s.a.v.): “Go‘zal xulq Allohning rahmatidan, rizoligidan bo‘lgan yugandir (jilov), u o‘z sohibining burnidan o‘tkazilgandir. Bu yugan Allohning qo‘lida, Alloh uni yaxshilikka, ezgulikka yetaklaydi, yaxshilik va ezgulik esa, uni jannat sari yetaklaydi. Yomon xulq esa, Allohning azobidan, g‘azabidan yasalgan yugandir va u o‘z sohibining burnidan o‘tkazilgan. Bu yugan Shaytonning qo‘lidadir. Shayton uni yomonlikka undaydi, yomonlik esa o‘z sohibini do‘zax sari yetaklaydi”. Ushbu bayonda Mahmud Zamaxshariy o‘z diniy dunyoqarashini ham aks ettirgan, deyish mumkin.

Xusrav I Anushervonning vaziri Buzurgmexr asarning “Taajjub, qiziq voqealar va ajoyibotlar haqida”gi 55-bobida shunday deydi:

Buzurgmexrdan so‘rashibdi, “Dunyodagi eng bilimdon inson kim?” U dedi: “Dunyodan kim boshqalardan ko‘ra kamroq ta’jub qilsa o‘sha inson oqil insondir”.

“Rabi’al-abror” asarida berilgan barcha nasihatlar, o‘gitlar va ma’lumotlar hozirgi yoshlarning ma’rifatiga ham xizmat qiladi. Chunki, asar insonning ijtimoiy hayotda yanada madaniyatli va yetuk shaxs bo‘lishi uchun bilishi kerak bo‘lgan barcha bilimlarni o‘zida mujassam etganligi bilan ahamiyatlidir.

“Aql – az-Zamaxshariyning tafsir qilish uslubi, u bilan nasslarga (Qur’on va hadislar) jilov beradi. U Qur’on ma’nolarining zohiriga (toshiga) qanoat qilmaydi”.[5]

Az-Zamaxshariy barcha alloma va ulamolar yuksak va hurmat bilan butun Sharq va G‘arb olimlarining “Ustoz ul-arab va-l-ajam”, “Faxru Xorazm”, “Ustoz ud-dunyo” kabi nomlar bilan ulug‘laydilar.

XULOSA

Mahmud az-Zamaxshariy o‘zining asarlari orqali suvni nafaqat hayotiy zaruriyat sifatida, balki chuqur ijtimoiy va falsafiy tushuncha sifatida ham tahlil qiladi. Uning qarashlariga ko‘ra, suv hayotning asosi bo‘lib, insonlar va jamiyatlar o‘rtasidagi aloqalarning barqarorligi va rivoji uchun muhim rol o‘ynaydi. Suv tabiiy boylik sifatida tenglik, adolat va axloqiy mas’uliyat bilan bog‘liq tushunchalarni ham anglatadi. Az-Zamaxshariy suvni in’om etilgan ne’mat sifatida ko‘rgan holda, uni to‘g‘ri boshqarish va jamiyatda adolatli taqsimlash zarurligini ta’kidlaydi. Suvning taqsimlanishi atrofida ijtimoiy adolat, teng huquqlilik va insoniy mas’uliyat masalalari yechim topadi. Az-Zamaxshariy falsafiy jihatdan suvni insonlar o‘rtasidagi o‘zaro bog‘liqlikning timsoli sifatida tushunadi. U

suvning hayotga bog‘liq har bir mavjudot uchun zarurligini ko‘rsatib, bu orqali insoniyatning bir-biriga bog‘liq va mas’uliyatli hayot kechirishini muhim deb biladi. Shu orqali suv, Zamaxshariy qarashlarida, tabiat va jamiyat o‘rtasidagi uyg‘unlikning, axloqiy tamoyillarning markazida turadi. Shunday qilib, Mahmud az-Zamaxshariy asarlarida suvning ijtimoiy-falsafiy tahlili jamiyatning rivoji va adolatli boshqaruvi uchun chuqur axloqiy va falsafiy tamoyillarni ifodalaydi. Suv – hayotning manbai bo‘lish bilan birga, insoniyatning birligi, ijtimoiy mas’uliyati va ahloqiy majburiyatlarini aks ettiruvchi ramz sifatida ham muhim ahamiyat kasb etadi.

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MADANIYLASHTIRILGAN *LAGOCHILUS INEBRIANS* O‘SIMLIGIDAN LAGOXILIN OLISH VA U ASOSIDA LAGOXIRZIN SINTEZ QILISH, FIZIK-KIMYOVIY KO‘RSATKICHLARINI ANIQLASH

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ANNOTATSIYA

Ushbu maqolada madaniylashtirilgan *lagochilus inebrians* o‘simligidan adabiyotlarda oldindan malum bulgan usulga asosan lagoxilin(L) olish va u asosida lagoxirzin(LZ) sintez qilish, ayrim fizik-kimyoviy ko‘rsatkichlarini o‘rganish haqida ma’lumotlar keltirilgan.

Kalit so‘zlar: *Lagochilus* o‘simligi, lagoxirzin, lagoxilin, Lagoden, 3,18-o-monoizopropiliden, 3,18,15,16-o-diizopropiliden lagoxilin, monoizopropiliden lagoxirzin

KIRISH

Lagochilus turidagi o‘simliklar o‘zining qon to‘xtatuvchi xususiyati bilan qadimdan ma’lum bo‘lib, u sharqning eng mashhur, samarali qon to‘xtatuvchi dorivor o‘simliklari qatoriga kiradi. *Lagochilus* o‘simligi asosidagi qaynatma va damlamalari turli qon oqishlarini to‘xtatishda amaliyotda qo‘llanilib kelmoqda. Lagochilus o‘simligi turlari farmakologiyasi Kuban, Samarkand, Andijon tibbiyot oliygohlari farmakologiya kafedralarida o‘rganilgan. Shulardan *Lagochilus inebrians* turining suvli va spirtli qaynatmalari gemostatik xususiyatdan tashkari tinchlantiruvchi, gipotensiv, sedativ, shokka karshi, nurlanishga qarshi va dezallergik (allergiyaga qarshi) singari fiziologik faol xususiyatlarga ega ekanligi aniklangan[1-2].

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Lagochilus inebrians o‘simligi O‘zbekistonning Navoiy viloyatining Nurota tumanida va Xatirchi tumaning Akmal Ikromov jamoa xo‘jaligi Navandak, Mirdosh, Langar qishlog‘ida soy buyi va jilg‘a hamda toshloq joylarida o‘sadi. Buxoro va Qashqadaryo viloyatlarida ham uchraydi. Chimkent vilayatining sobiq Frunze davlat xo‘jaligida darmana qishlog‘ida o‘stirilgan. Samarqand viloyatining Qo‘shrabot, Gujumsoy, Bozorjoy, Jush, qishloqlarida yovoyi holda o‘sadi.

Dorivor o‘simliklardan tabiiy dori vositalari olishda O.S.Sodiqov va S.Yu.Yunusovlar o‘ziga xos ilmiy maktab yaratishgan. O‘zbekistonda 1956 yilda O‘simlik moddalari kimyosi ilmiy tadqiqot instituti tashkil etildi va unga S.Yu.Yunusov rahbarlik qildi. 1946 yilda ToshDU (hozirgi O‘zMU) kimyo fakultetida tabiiy birikmalar kimyosi kafedrasiga asos solindi va unga O.S.Sodiqov rahbarlik qildi. 1956 yilda shu kafedra qoshida muammolar laboratoriyasi tashkil etildi. Kafedra va laboratoriyada dorivor o‘simliklarni o‘rganish bo‘yicha katta ilmiy tadqiqot ishlari olib borildi. Natijada bir necha dori vositalari yaratildi va tibbiyot hamda qishloq xo‘jaligiga joriy qilindi, ushbu soha bo‘yicha o‘nlab fan doktorlari, ko‘plab fan nomzodlari etishib chiqdi.

Lagochilus o‘simligi asosidagi qaynatma va damlamalari turli qon oqishlarini to‘xtatishda amaliyotda qo‘llab, bu soha rivojiga uz xissalarini qushgan akademiklardan O.S.Sodiqov., S.Yu.Yunusov., N.Q.Abubakirov., I.P.Sukervanik., Sh.I.Salixov., B.T.Ibragimov., A.S.Turaev, fan doktorlari, professorlardan X.A.Aslanov., A.I.Ismoilov., P.Yu.Yuldashev., X.A.Abduazimov., M.I.Ikramov., I.E.Akopov., X.A.Aslanov., U.N.Zaynutdinov., D.N.Dalimov., Z.I.Mavlankulova., S.I.Muhamedxanova., V.B.Leontev., R. Islomov., A.Saidxodjaev., V.Malikov., I.K.Komilov., M.I.Sultonov., U.B.Zokirov., S.S.Sahobiddinov., X.X.Xolmatov., R.L.Xazanovich va boshqalarning xizmatlari katta bo‘lgan.

Lagochilus inebrians o‘simligi ko‘p yillik bo‘yi 20-60 sm ga etadigan o‘t o‘simlik. poyasi sershox, ko‘tariluvchi, asos qismi yog‘ochlashgan, to‘rt qirrali bo‘lib, qattik bezli tuklar bilan qoplangan. Bargi oddiy, uch-besh bo‘lakka qirqilgan, poyada va shoxlarida bandi bilan qarama-qarshi joylashgan. Gullari pushti rangli, poyada va shoxlarida yarim xalka shaklida o‘rnashgan. Mevasi 4 ta yong‘oqcha bo‘lib iyun-sentabr oylarida gullaydi. *Lagochilus inebrians* o‘simligini yig‘ib olish vaqti iyul-avgust oyidir. *Lagochilus inebrians Bge* o‘simligi va uning guli, o‘rug‘lari1-rasmda keltirilgan.[3-4]



1-rasm.*Lagochilus inebrians Bge* o‘simligi.

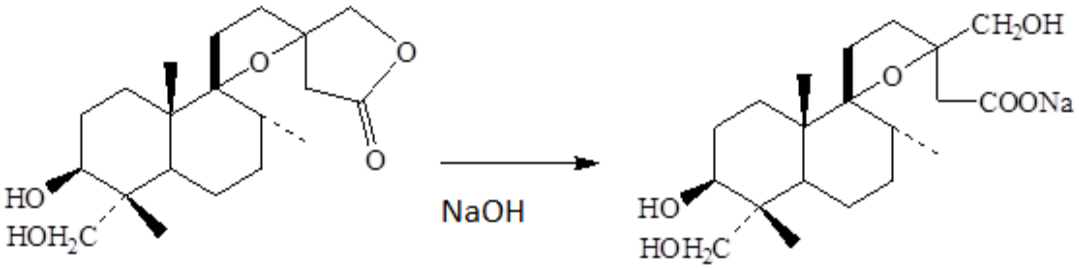
Lagochilus inebrians o‘simligining kimyoviy tarkibida vitamin K1, 0,6-1,97 % lagoxilin, 0,67 % flavonoid glikozidlari, 44-77 mg % askorbin kislota, 6-7 % organik kislotalar, 5-10 mg % karotin, 9,66-12,42 % smola, 2,58-2,78 % oshlovchi va boshka moddalar hamda kalsiy va temir tuzlari bo‘ladi. Lagochilus inebrians bargi tarkibida lagoxilin, 0,03 % efir moyi, 11-14 % oshlovchi moddalar, organik kislotalar, 7-10 mg % karotin va 77-100 mg % vitamin C bo‘ladi. [3-17].

Lagoshilus o‘simliklarida tabiiy guruh birikmalarining besh turi uchraydi. Ularning qaysi bir guruhi qon to‘xtatish xossasiga ega bo‘lishini bilish uchun quyidagi tajriba amalga oshirilgan.

Lagoshilus inebrians o‘simligidan olingan ekstraktiv moddalar yig‘indisi ikkiga - diterpenoidli va diterpenoidsiz qismlarga bo‘lingan. Farmakologik tadqiqotlarda diterpenoidli qism yuqori qon to‘xtatish xossaga egaligi aniqlangan. Lagoxilindan mono- va diatsetillagoxilin aralashmasi sintez qilingan. Aralashmaning 0,2% li suvli eritmasi o‘simlikning suvli damlamasiga o‘xshash qon to‘xtatish faolligini ko‘rsatilgan. *Lagoshilus inebrians* o‘simligidan olingan 3-mono-o-atsetillagoxilin suvda 1% atrofida eriydi. Demak, *Lagoshilus inebrians* o‘simligining asosiy ta’sir etuvchi moddalari, ya’ni qon to‘xtatuvchi birikma bo‘lib mono- va di-o-atsetillagoxilin yig‘indisi xizmat qiladi.

Lagoshilus avlodiga kiruvchi 11 tur o‘simliklardan 31 ta tabiiy birikmalar ajratib olingan, ammo ularning xech biri suvda erimaydi. Lagoshilus hirsutissimus, *Lagoshilus* setulosus, *Lagoshilus gypsaceus* o‘simliklaridan lagoxirzin birikmasi ajratib olingan. U ham suvda erimaydi, ammo uning molekulasida lakton guruhi mavjudligi sababli ishqor ta’sirida suvda yaxshi eruvchi tuz hosil qiladi va u “Lagoden” deb nomlangan [8-12].

Ammo bu o‘simliklarda lagoxirzin miqdori 0.1-0.3% ni tashkil etadi. Ushbu o‘simliklarning zahirasi ham juda kam. Lagoxirzin natriy ishqori bilan reaksiyaga kirishib, lagoxirzinning natriyli tuzi yoki “Lagoden” hosil bo‘lish reaksiyasi quyida keltirilgan(1-sxema) [8]:.



lagoxirzin lagoden (lagoxirzinning natriyli tuzi)

1-sxema. Lagoxirzin natriy ishqori bilan reaksiyaga kirishib, lagoxirzinning natriyli tuzi yoki “Lagoden” hosil bo‘lishi.

Lagodenni lagoxilindan sintez qilish ham amaliy, ham iqtisodiy jihatdan qulaydir. Lagoxilin *Lagochilus inebrians* o‘simligida 2-2,5% ni tashkil etadi. Ushbu o‘simlik Samarqand, Buxoro va Navoiy viloyatlarida keng tarqalgan, uni madaniylashtirish ishlari ham amalga oshirilmoqda. [8-12].

Lagoxilindan lagoxirzin sintez qilish texnologiyasini yaratishda Sh.I.Salixov., B.T.Ibragimov., X.A.Aslanov., A.I.Ismoilov., M.I.Ikramov., I.E.Akopov., X.A.Aslanov., U.N.Zaynutdinov., R. Islomov va boshqalarning xizmatlari katta bo‘lgan. Lagoxilindan lagoxirzin sintez qilish texnologiyasini yaratish uchun avval o‘simlikdan lagoxilin ajratib olish texnalogiyasi yaratilgan. Lagoxilinni atseton bilan o‘zaro ta’sirlanishidan 3,18-o-izopropilidenlagoxilin olish usuli ishlab chiqilgan. [9].

“Lagoden” dori vositasi sintezida avval lagoxilinni lagoxirzinga aylantirish lozim. Buning uchun lagoxilindan to‘rtta vodorod atomini tortib olish kerak. Ammo lagoxilinni degidrolash reaksiyasida murakkab aralashma hosil bo‘ladi, chunki bu reaksiyada lagoxilindagi hamma gidroksil guruhlar reaksiyaga kirishadi. Lagoxilindagi 15- va 16-holatdagi gidroksil guruhlarni tanlab oksidlash uchun esa 3- va 18-holatdagi gidroksil guruhlarni himoyalash zarur.

Lagoxilinni faqat 3,18-holatdagi hosilalarini sintezi nihoyatda qiyinligi tadqiqotlarda aniqlandi. Lagoxilin molekulasidagi 3- va 18- holatlardagi gidroksil guruhlarni himoya qilish “Lagoden” preparatini sintezida muhim ahamiyatga ega.

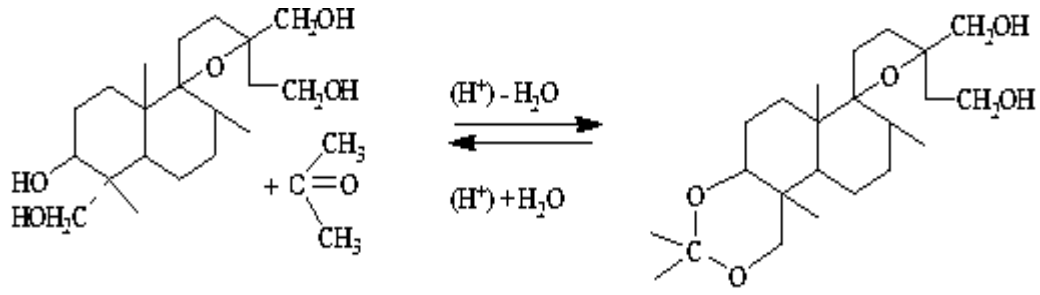
lagoxilinni qator hosilalari ichida 3,18-dagi gidroksil guruhlarni himoyasida 3,18-o-izopropilidenlagoxilindan foydalanish maqsadga muvofiqdir.

Ma’lumki, lagoxilin ikki hil - ketal va atsetal hosilalarini beradi. Lagoxilin molekulasi ketonlar hamda aldegidlar bilan

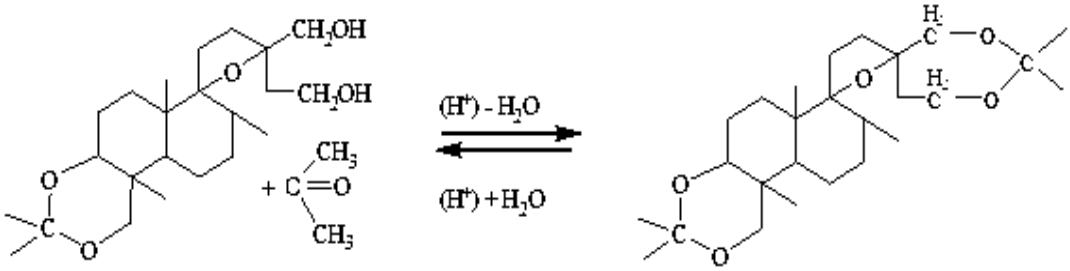
birinchi galda reaksiya C3 va C18 dagi gidroksil guruhlari bilan ketadi va bunda olti a'zoli 1,3 dioksan sikli hosil bo'ladi. Shundan keyin C15 va C16 dagi gidroksil guruhlarga aldegid yoki ketonlarni birikish reaksiyasi yuz beradi. Bunda etti a'zoli sikl hosil bo'ladi.

Lagoxilin molekulasining faqat C15 va C16 dagi gidroksil guruhlarida o'rin almashgan hosilalari shu kunga qadar sintez qilinmagan. Barcha reaksiyalarida lagoxilinning 3,18-mono o'rin almashgan yoki ko'pincha 3,18- va 15,16-da o'rin almashgan birikmalari hosil bo'ladi.

"Lagoden" dori vositasi sintezidagi oraliq mahsulot - 3,18-o-izopropiliden lagoxilinni yuqori unumda sintez qilish muhim ahamiyatga ega. Lagoxilin bilan atsetonning o'zaro reaksiyasini kuchsiz kislotali sharoitda adabiyotlardagi ma'lum usulda olib borildi. Bu qaytar reaksiya quyidagicha bo'ladi. (2-sxema) [8]:.



Lagoxilin atseton 3,18-o-monoizopropilidenlagoxilin



3,18-o-monoizopropiliden lagoxilin atseton 3,18,15,16-o-diizopropiliden lagoxilin

2-sxema. 3,18-o-monoizopropiliden va 3,18,15,16-o-diizopropiliden lagoxilin olinishi.

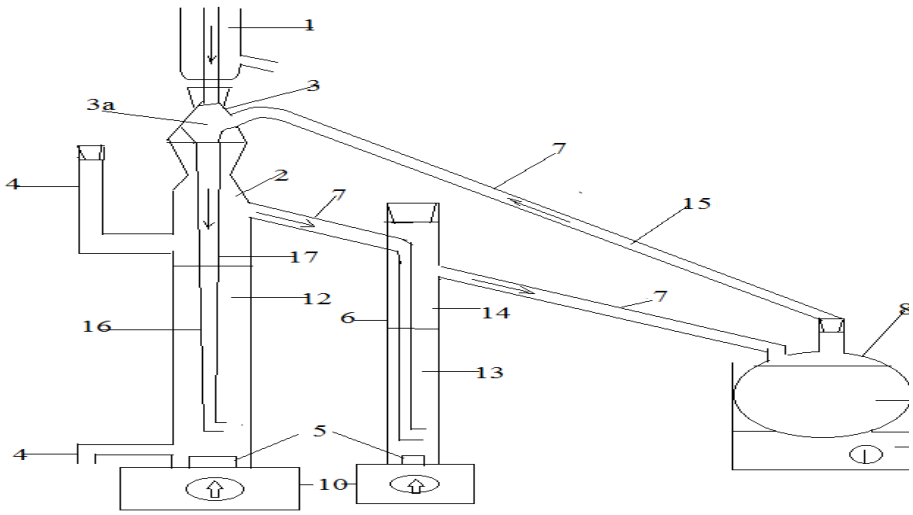
Bu reaksiya Le-Shatele qoidasiga bo'ysunadi, unga ko'ra reaksiyada suv miqdori ko'paysa di-o-izopropilidenlagoxilinni hosil bo'lishi kamayadi va natijada lagoxilinni atseton bilan ketal hosil qilishi birinchi bosqichda to'xtaydi.

Reaksiyaning birinchi bosqichida reaksiya aralashmasida atseton, lagoxilin, 3,18-o-monoizopropilidenlagoxilin va suv mavjud. Ushbu aralashmadan 3,18-o-monoizopropilidenlagoxilin

ajratib olinsa, reaksiya muvozanati 3,18-o-monoizopropilidenlagoxilin hosil bo‘lish tomoniga siljiydi. Suv va atsetonli reaksion aralashmadan siklogeksan bilan ekstraksiya qilib 3,18-o-monoizopropilidenlagoxilinni 80-90% unum bilan ajratib olish mumkin.

Reaksiyada hosil bo‘ladigan 3,18-o-monoizopropiliden lagoxilinni sintezi va ayniqsa uni ekstraksiyasi juda og‘ir jarayon hisoblanadi. Shuning uchun uni sintezida va ekstraksiyasida ishchi kuchini kamaytirish va ekologik talablarni hisobga olgan holda 3,18-o-izopropilidenlagoxilinni sintezini amalga oshirish uchun avtomatik ekstraksiya qiluvchi maxsus laboratoriya qurilmasi yaratildi (3-sxema). Qurilmaning ishlashi quyidagicha: 16 g (0,045mol) lagoxilin 400 ml atsetonda eritiladi, unga 240 ml 2%-li sulfat kislota quyiladi. Ushbu reaksiya aralashmasi, reaksion-ekstraksion reaktorga (2) teshik orqali (4) quyiladi. Haydash kolbasiga (8) 1,5 l siklogeksan solinadi. Silindrga (6) 200 ml 5% natriy gidrokarbonat eritmasi quyiladi. Magnit aralashtirgich (10) va elektr plitka yoqiladi. Qurilma 8 soat ishlagandan keyin to‘xtatiladi. Kolbada (8) yig‘ilgan 3,18-O-monoizopropiliden lagoxilinning siklogeksanli eritmasidan siklogeksan haydaladi. Qoldiqni Shotta voronkasida siklogeksan-atseton (13:1) aralashmasi bilan yuviladi. Reaksiya unumi 91%.

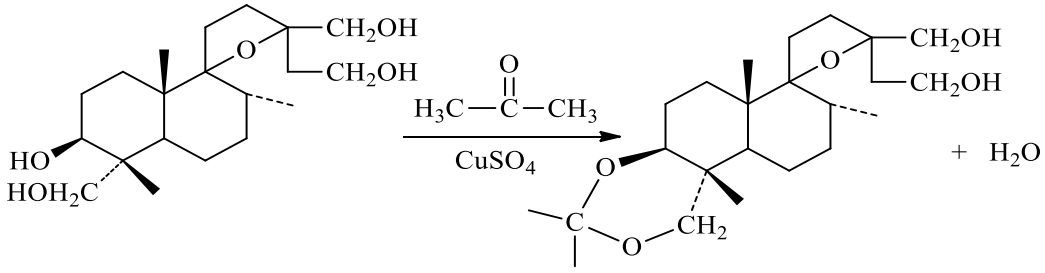
Sintez qilingan 3,18-o-monoizopropilidenlagoxilinni katalizator ishtirokida degidrolash reaksiyasi olib borildi. Bunda katalizator sifatida aktivlangan nikel Reneydan foydalanildi. Reaksiya toluol erituvchida olib borildi. 3,18-o-monoizopropilidenlagoxilin, katalizator va toluol 1:3:13 nisbatda olinganda lagoxirzin eng ko‘p hosil bo‘ldi. Reaksiya 110 ^{0}C da 2,5-3 soat davomida amalga oshadi. Bunda 3,18-o-izopropilidenlagoxilin 70-75% unumda 3,18-o-monoizopropiliden lagoxirzin hosil bo‘ladi. Ushbu birikma kislotali gidroliz qilinsa lagoxirzin hosil bo‘ladi. Lagoxirzin natriy ishqori bilan reaksiyaga kirishib, lagoxirzinning natriyli tuzi yoki “Lagoden” hosil bo‘ladi [8]:.



3-sxema. 3,18-o-monoizopropilidenlagoxilin olishning laboratoriya qurilmasi.

1 - teskari suv sovutgich; 2 - reaksion-ekstraksion reaktor; 3 - 3a teshikli voronka; 4 - reaktorni bo‘shatish va to‘ldirish uchun teshiklar; 5 - magnit aralashtirgichning aylanuvchi temiri; 6 – 5 % li natriy gidrokarbonat eritmasi solingan silindr; 7 - birlashtiruvchi trubkalar; 8 - eritmani haydash uchun kolba; 9 - kolbani isituvchi elektr plitka; 10 - magnit aralashtirgich; 11 - suv hammomi; 12 - kislotali va suvli-atsetonli lagoxilinning reaksion eritmasi; 13 - 5% natriy gidrokarbonat eritmasi; 14 - neytrallangan ekstrakt; 15 - siklogeksan erituvchining pari; 16 - siklogeksan erituvchi; 17 - 3,18-o-monoizopropilidenlagoxilinning siklogeksandagi eritmasi; 18-3,18-o-monoizopropilidenlagoxilinning konsentrlangan eritmasi.

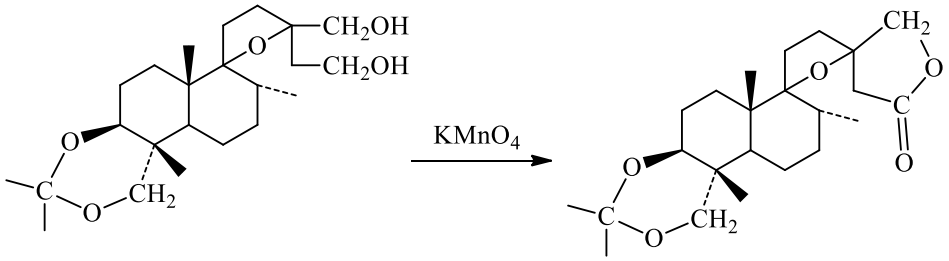
Lagoxilin atseton bilan suvsiz mis sulfat ishtirokida reaksiyaga kirishganda 3,18-o-monoizopropilidenlagoxilin hosil bo‘ladi. Uning sintezi 4-sxemada keltirilgan. [8]:



Lagoxilin 3,18-o-monoizopropilidenlagoxilin

4-sxema. 3,18-o-izopropilidenlagoxilin sintezi sxemasi

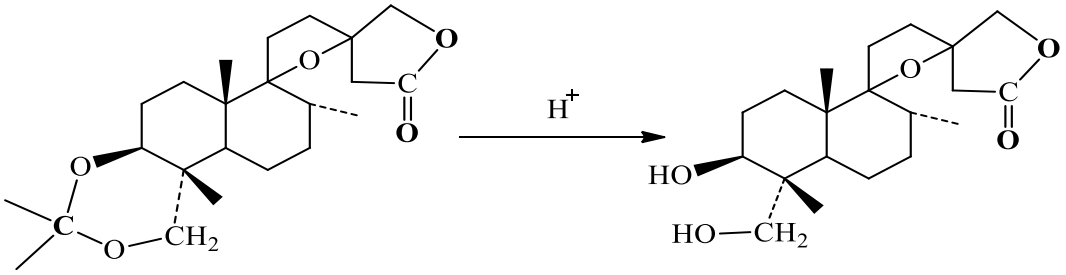
3,18-o-izopropilidenlagoxilin kaliy permanganat bilan oksidlanganda, izopropilidenlagoxirzinga o‘tadi. Uning sintezi 5-sxemada keltirilgan.



3,18-o-izopropilidenlagoxilin monoizopropilidenlagoxirzin

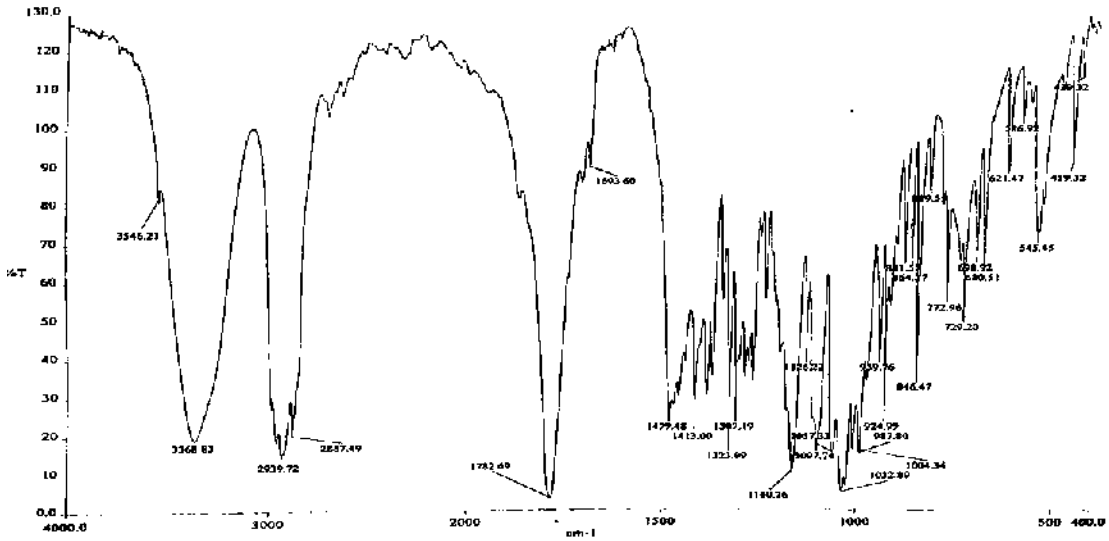
5-sxema. 3,18-o-monoizopropilidenlagoxirzin sintezi sxemasi

Izopropilidenlagoxirzinni kislotali gidroliz qilinganda lagoxirzin hosil bo‘ladi. Uning sintezi 6-sxemada keltirilgan



izopropilidenlagoxirzin lagoxirzin

6-sxema. Lagoxirzinni sintezi sxemasi



2.-rasm. Lagoxirzinni IQ spektri

Lagoxirzinning IQ-spektrida molekulasidagi OH guruxlarining valent tebranish chastotalari 3368 sm^{-1} sohalarda intensiv holatda kuzatilgan, CH_3, CH_2 guruxlarning valent tebranish chastotalari 2939, 2887 sm^{-1}larda namoyon bo‘lgan, 1782, 1693 sm^{-1} larda CH_3, CH_2, CH guruxlarining deformatsion tebranish chastotalari 1160 sm^{-1} da epoksid halqaning simmetrik valent tebranishlari, 987 sm^{-1} da ularning asimmetrik tebranishlariga xos chastotalar 864 sm^{-1} da esa ushbu halqaning deformatsion tebranishlari kuzatilgan. 1032 sm^{-1} larda molekuladagi C-O-C, C-OH bog‘larining valent tebranish chastotalari intensiv holatda kuzatilgan Lagoxilin va lagoxirzinng ayrim fizik-kimyoviy ko‘rsatkichlari (1-jadval)da keltirilgan.

1-jadval

Lagoxilin va lagoxirzinng fizik-kimyoviy kattaliklari va IQ-spektral xarakteristikasi

№	Moddalar	Brutto formulasi va tashki ko‘rinishi M.Mas.	T.suyuq. C^0	R_f^* (tizim)	/α /D 0,5% suv:etanol 1:1	Eruvchanligi	IK spektri sm^{-1}
1.	Lagoxilin (L)	$C_{20}H_{36}O_5$ Oq kristal 356	167-168	0,19 (I) 0,26 (II)	-	Etanol Atseton Dioksan Piridin	1053(-O-) 2938,(CH_3) 3336,(OH)
2	Lagoxirzin (LZ)	$C_{20}H_{32}O_5$ Ok kristal 352	141-142	0.53 (II)	+76	Etanol Atseton Piridin	1782, (-O-) 2939, CH_3) 3368, (OH)

I. Etilatsetat, **VI.** Xloroform-etanol 5:1

Olingan birikmalarning tarkibi va tuzilishini o‘rganish natijalari, ularning individual birikma ekanligini ko‘rsatdi.[13-17]:

lagoxirzin moddasini olinish usuli juda qiyinchilik to‘g‘diradi va tannarxi qimmatga tushishi isbotlangan.

XULOSA

Madaniylashtirilgan *lagochilus inebrians* o‘simligidan adabiyotlarda oldindan malum bulgan usulga asosan lagoxilin(L) olindi va u asosida lagoxirzin(LZ) sintez qilindi va ayrim fizik-kimyoviy va spektral parametrlari o‘rganildi.

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TRANSISTORS: THE CORNERSTONE OF MODERN ELECTRONICS

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ABSTRACT

This study investigates the characteristics and operation of transistors, which are essential components in modern electronics. By examining the structure and types of transistors (PNP and NPN) as well as their circuit configurations (common emitter, common base, and common collector), the research highlights their diverse applications. Transistors, invented in the mid-20th century, have replaced vacuum tubes due to their compact size, low power consumption, and high reliability. These advantages enable integration into complex circuits, leading to significant advancements in computing power. The findings emphasize that transistors have been pivotal in the evolution of electronics and continue to play a vital role in the design and functionality of contemporary electronic systems. A deeper understanding of transistor features and operational principles is crucial for advancing electronic technologies and enhancing the performance of modern devices. This study contributes to the existing literature by providing insights into the fundamental role of transistors in modern electronics.

Keywords: Transistors, modern electronics, PNP and NPN configurations, circuit configurations, amplifier, switch .

Introduction

Transistors are fundamental electronic components that have enabled the remarkable development of modern electronics. They can act as switches or amplifiers and are used in a wide variety of electronic circuits and devices. Transistors were invented in the mid-20th century, replacing the bulky and power-hungry vacuum tubes that previously dominated electronics. The key advantages of transistors are their small size, low power requirements, and high reliability. This allows them to be used in complex integrated circuits, packing a large amount of computing power into a small package. The basic structure of a transistor consists of three semiconductor crystals arranged in a specific configuration, with the PNP and NPN arrangements being the most common. Transistors can be used in different circuit configurations, such as common emitter, common base, and common collector. This study examines the

general characteristics and operation of transistors. This understanding is crucial for designing and working with modern electronic systems. The findings show that transistors have been key enablers of the remarkable development of electronics in the 20th century and have widespread applications in today's electronic circuits.

Before the invention of the transistor in the first half of the 20th century, electronics depended on vacuum tubes, which were bulky, expensive, and uneven, required a lot of power, and produced a lot of heat. The invention of transistors led to modern electronics, making smaller and more powerful electronic devices possible because transistors require little power, don't generate much heat, and are very reliable [1,2].

A typical transistor consists of three P-type and N-type semiconductor pieces. Small transistors can be used in complex integrated circuits, making it possible to pack a lot of computing power into a small package. There are two main types of transistors: bipolar junction transistors (BJTs) and field effect transistors (FETs) [3,4].

The construction of bipolar transistors and their structure has come a long way since the first transistors were made. Today's transistors are manufactured using complex processes, and the transistor structure enables them to have very high performance. The modern era of semiconductor electronics began with the invention of the bipolar transistor in 1947 by John Bardeen, Walter Hauser Brattin and William Shockley [5,6]. This piece, along with its field counterpart, has had a surprising impact on almost every aspect of modern life.

A BJT transistor uses electrons and electron deficiencies (as electron holes) to carry charge. When an electron leaves its current state for a higher electron, holes are left in the conducting material. These holes can move like electrons in matter and behave like positively charged particles [6,7]. When a small current is applied to one of the BJT's terminals, it effectively allows the transistor to control much more current between the emitter and the collector, which in turn allows the current to be amplified or changed.

In this tutorial, we will focus only on the bipolar junction transistor and discuss its basic structure and operation. A typical transistor (BJT) is made up of three P-type semiconductors. The arrangement of semiconductor crystals is shown in Figure 1 [8,9].

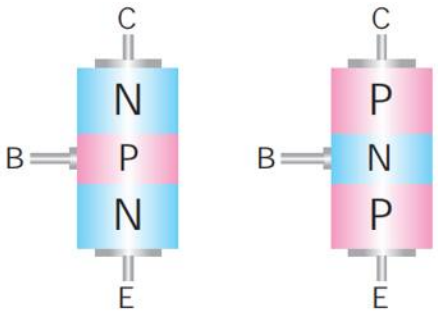


Figure 1. N and P type semiconductors in transistors

Bipolar Junction Transistor (BJT)

A typical transistor consists of three P and N type semiconductor pieces. The difference between PNP and NPN BJT is in the bias, which is the direction of current allowed to flow. In a PNP BJT, there are two positively charged regions - the collector and the emitter - each with additional holes. The depletion region in between the two is negatively charged because it has extra electrons. Boundaries between regions are called links. The base-emitter junction is reverse biased and the base junction is collected is forward A small voltage is applied to the base region. In an NPN BJT, there are two negatively charged regions - the collector and the region Emitter - each with extra electrons. The discharge region is positively charged because it has extra holes. In an NPN BJT, the base-emitter junction is forward-biased and the base-collector junction is reverse-biased. A small voltage is applied to the base Region [2,6]. The transistor which is made of two P-type semiconductor pieces and one N-type semiconductor piece is called PNP transistor and the transistor which includes two P-type semiconductor pieces and one P-type semiconductor piece is called NPN transistor. Figure 2 shows two types of NPN and PNP transistors and their symbols [7,9].

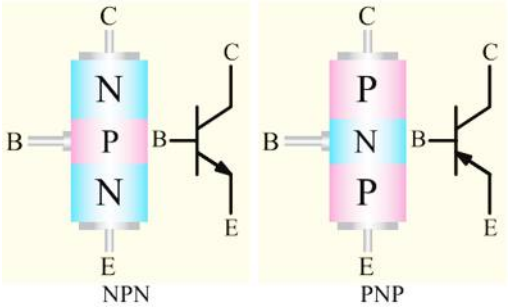


Figure. Conventional symbols of PNP and NPN transistors

The bases of the transistor are called emitter (E), base (B) and collector C. Figure 4 shows the names of transistor bases [3,6].

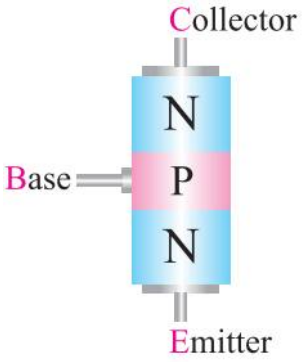


Figure3. Names of transistor bases

Equivalent to PNP and NPN transistor diodes

Each P-N connection is equivalent to a diode, so the diode equivalent of NPN and PNP transistors is drawn in Figure. [8].

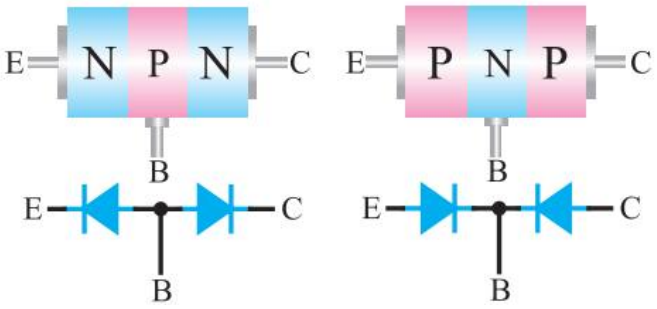


Figure.4 Equivalent of NPN and PNP diode transistors

How to bias the transistor in the active region

In the active region, it is necessary to place the base-emitter diode in the positive bias and the base-collector diode in the opposite bias so that currents are established in the transistor. Figure 5 shows how to bias an NPN transistor in the active region [2,6].

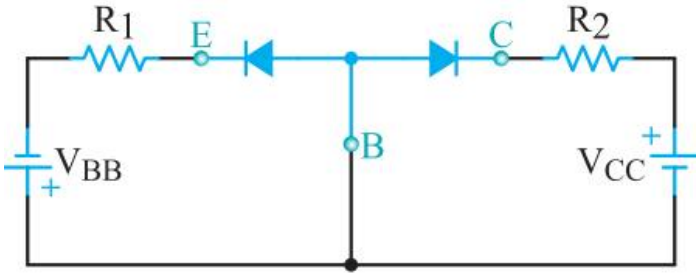


Figure5. NPN transistor bias in the active region

BJTs under Varying Voltages

A transistor's functions depends on the voltages applied and the polarity of the current. The following formulas show the function of the transistor in various scenarios. The subscripts refer to the base (VB), the collector (VC), and the emitter (VE).

- If $VE < VB < VC$, then the transistor acts as an amplifier.

- If $VE < VB > VC$, then the transistor is a conductor.
- If $VC > VB < VE$, then the transistor is an open switch and cuts off the flow.

Think of positive voltages as being greater than zero, or $+V > 0$, and negative voltages as being less than zero, or $-V < 0$. This will make working through these formulas easier [6].

Power BJTs

The n-p-n bipolar junction transistor, BJT in short, is shown in Figure 6 The collector (C) to emitter (E) path serves as the switch, conducting or interrupting the main current, while the base (B) is the control electrode. In contrast to thermistors, the collector current, I_C, can be continuously controlled by the base current, I_B, as

$$I_C = \beta I_B$$

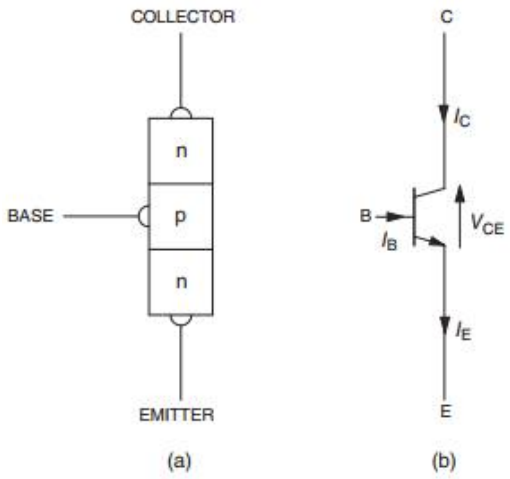


Figure 6. BJT: (a) semiconductor structure, (b) circuit symbol.

Where β denotes a dc current gain of the transistor. In high-power $BJTs$, the current gain is low, on the order of 10. The emitter current, I_E, is a sum of the collector and base currents. The voltage–current characteristics of the BJT, specifically the collector current, I_C, versus collector–emitter voltage, V_{CE}, relations for various values of the base current, I_B, are shown in Figure 7 The conduction power loss, P_c, is given by [3,6,8].

$$P_c = V_{CE} I_C$$

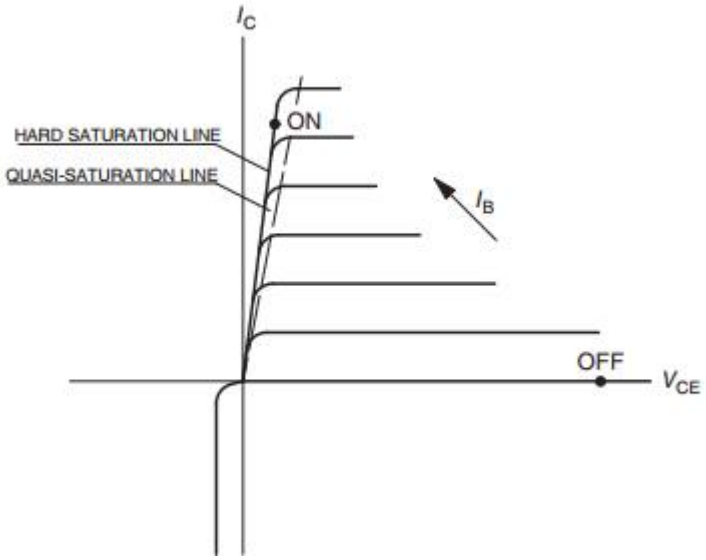


Figure 7. Voltage–current characteristics of the BJT

Conclusion

This study has explored the critical characteristics and operational principles of transistors, which are fundamental components of modern electronics. The investigation into PNP and NPN configurations, along with circuit arrangements such as common emitter, common base, and common collector, highlights the versatility and wide-ranging applications of transistors. Since their introduction in the mid-20th century, transistors have effectively replaced vacuum tubes, thanks to their compact size, low power consumption, and high reliability. These advantages have enabled the integration of transistors into complex circuits, leading to remarkable advancements in computing power and electronic performance. The findings emphasize that transistors are pivotal to the ongoing evolution of electronic technology, playing a vital role in contemporary system design and functionality. Understanding their operational principles is crucial for driving future innovations in electronic technologies. Overall, this study reaffirms the significance of transistors as the cornerstone of modern electronics.

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EFFECT OF BIOLOGICAL MATERIALS ON THE ENVIRONMENT

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ABSTRACT

Developing countries are experiencing advancements in industrial, agricultural, and other sectors, alongside a rapid increase in population, placing the environment in the spotlight. Attention to environmental cleanliness and the removal of existing pollution has become one of the most important contemporary issues. Given that the world has been advancing in biotechnology in recent years, it seems rational to utilize biological materials technology as a strong support in implementing major environmental programs in the country. The term "environment" refers to everything that surrounds us and is related to human life, including water, soil, air, and more. The environment plays a crucial role in the lives of individuals in society, and attention to its health and efforts to improve its hygiene and restore it from pollution are of great importance.

Nowadays, many people around the world live in polluted environments due to natural disasters, war, and inadequate infrastructure. On average, 5,500 children die daily from diseases caused by consuming contaminated water and breathing polluted air. All researchers strive to reduce these problems using modern methods and new technologies. One of these methods is bioremediation, the importance of which has become evident shortly after its emergence.

Keywords: Biological, Microbial, Microorganisms, Environment, pollution,

Introduction

The environment is considered a crucial factor in human life, as people have a close relationship with their surrounding environment throughout their lives. The environment is divided into three main components: water, air, and soil.

Water, being one of the essential elements of life on Earth, is vital for human survival. On average, a person drinks 2 to 2.5 liters of water daily, and water constitutes 58 to 66 percent of an individual's body weight. Breathing is also a crucial factor for human life. The human body requires oxygen to carry out all its functions, and living without clean air would be impossible.

Air pollution is the presence of one or more pollutants in the ambient air to an extent and duration that alters its quality in a way that is harmful to human health, animals, plants, or structures. The major sources of air pollution include natural and anthropogenic sources. Natural sources often exist without direct human intervention, while anthropogenic sources are human-made and the pollution they cause results from human activities.

Soil is another primary resource for providing human food. It significantly impacts human life, and soil pollution leads to many diseases in plants and animals, thereby threatening human health.

Examining how water, air, and soil become polluted, as well as addressing existing pollution, is considered crucial and is a fundamental aspect of human life.

Biological pollution

An introduction to biological pollution

Biological materials refer to substances that carry living organisms such as bacteria, viruses, fungi, algae, and others.

These tiny yet impactful organisms enter our surrounding environment through the use of biological fertilizers, herbicides, pesticides, human waste, and the skin and tissues of dead animals, among other sources, and they cause diseases and infections in people.

Since the conditions are favorable for the rapid growth and multiplication of these microscopic organisms, the initial stages of biological contamination are not easily detectable. Examining and identifying biological contamination in water, air, and soil is considered very important and is one of the methods for improving and maintaining the quality of health within a community.

Water pollution

Water is one of the most abundant and stable compounds found in nature and is known as the largest chemical solvent. It is a fundamental component of body tissues and is recognized as the most essential factor for life, without which physiological functions cannot occur. Water constitutes about 70% of the human body's weight and covers approximately 71% of the Earth's surface in the form of oceans, lakes, and rivers. The average annual rainfall worldwide is 76.2 centimeters, with about 97.3% of water in the oceans, 2.1% in polar ice, and 0.6% in lakes, rivers, and underground sources.

In principle, the total amount of water on Earth remains constant, but it is not distributed uniformly. Some regions have sufficient water resources, while others have insufficient amounts to meet the needs of human populations. Consequently, natural waters are processed through various operations to make them suitable for different uses. Although a community often obtains its water from a single source, when a single source is inadequate to meet the needs of the population, water is drawn from multiple sources, such as surface and groundwater. Surface water is sourced from large rivers or lakes, and even water from a small river can be suitable for use; in such cases, the water is collected and stored using a dam.

Surface waters vary in quality and contain microorganisms, dissolved and suspended organic and inorganic materials. Additionally, these waters may have undesirable color, taste, and odor. Surface waters are exposed to contamination from urban sewage, industrial waste, agricultural runoff, and animal and plant residues. The temperature of surface waters changes in accordance with the local climate.

Although groundwater is also subject to contamination, it is generally clearer and colorless, with lower amounts of organic materials and microorganisms compared to surface water, as the water undergoes some degree of filtration as it passes through different soil layers. In contrast, mineral content (such as calcium and magnesium ions), which is a primary cause of water hardness, may be higher in groundwater than in nearby surface waters. Generally, the quantity and type of minerals in groundwater reflect the mineral characteristics of the region's geology. Over time, the quality of groundwater tends to be more stable compared to surface water quality.

The temperature of groundwater is generally more stable than that of surface water and is usually close to the annual average air temperature of the region, whereas surface water temperatures vary with the local climate. Groundwater may only need microbial treatment to be suitable for general use. Depending on the type of contamination, certain substances that cause complaints among consumers should be removed from the water or reduced to levels that are tolerable for consumers and do not have adverse effects on their health.

Surface waters generally require more treatment compared to groundwater to be made suitable for public use. Engineering and environmental sciences emerged in the latter half of the 19th century due to findings that indicated water could be a cause of certain dangerous diseases affecting humans. Engineers involved in water supply sought ways to ensure that the provided water was safe and palatable.

Fundamental measures included coagulation and filtration in the late 19th century, followed by disinfection with chlorine in the early 20th century. Despite these fundamental measures, waterborne diseases are still prevalent in both developed and developing countries and remain a major cause of illness.

Additionally, some waterborne diseases in developed countries are now caused by organisms that previously did not pose a concern. New pathogens have emerged for which there is no historical basis to design preventive measures, and in some cases, there are no suitable methods for tracking these pathogens.

Given the fundamental importance of pathogenic microorganisms associated with water, engineers and scientists involved in water and sewage treatment need to be aware of pathogens transmitted through fecal or food sources.

The water test to find indicator organisms is a practical method for determining microbial contamination in water. Indicator organisms are used to indicate contamination and possess the following characteristics:

1. They are always present in contaminated waters.
2. They are not seen in uncontaminated waters.
3. They survive in water with more pathogenic factors.
4. They are easily identifiable.

All forms belong to a group of bacteria that exhibit all the above characteristics and are used as indicators of microbial contamination in water. Typically, coliform bacteria are not pathogenic themselves but are often found alongside infectious microbes in water. Moreover, the number of coliform bacteria is much higher than pathogenic microbes, and they often survive longer in water. Coliform bacteria are easily identified in laboratory tests.

According to a rule, if coliform bacteria are present in water, it is assumed that pathogenic microbes may also be present, indicating the water is microbiologically unsafe. Conversely, if coliform bacteria are absent, the opposite of the above rule holds true, meaning pathogenic microbes are not present in the water.

Many waterborne diseases are well-known for causing gastrointestinal illnesses because they result from ingesting water or consuming food contaminated with human feces. This contamination can be prevented through proper hygiene practices. These diseases are prevalent in developing countries where people lack the economic means for prevention or have insufficient knowledge about disease transmission methods. Many biological agents are responsible for gastroenteritis, a term used for diseases

caused by water or food where the causative agent is unidentified. Gastroenteritis leads to stomach and intestinal inflammation, followed by diarrhea and severe discomfort. Pathogens associated with water and food cover a wide range of microorganisms from viral particles to multicellular organisms. Since all microorganisms are particulate, they can be removed from water through processes like sedimentation or filtration. Some pathogens, particularly bacteria, can be eliminated using disinfectants such as chlorine or ozone. Only a small number of viruses capable of causing infections in humans are found in water. Poliovirus was previously considered a significant waterborne disease agent due to its prolonged lifespan in water, but its primary mode of transmission is undoubtedly direct human contact.

Currently, a concerning waterborne virus causing infectious hepatitis is the Hepatitis A virus. The most significant issue arises from consuming hard-shelled seafood like shellfish, which can concentrate viral particles from fecally contaminated water through filtration.

An important epidemic of infectious hepatitis that infected nearly 30,000 people occurred in Delhi, India, in 1955, with the cause being the entry of sewage discharged into the river into the inlet of the water treatment plant. Apparently, the disinfection process used was not sufficient to eliminate the viruses, resulting in a widespread epidemic. Viruses like Cox sackie, Norwalk, Rotavirus, and Echo are agents of gastroenteritis and diarrhea. Contaminated food, shellfish, or water can transmit these viruses. Waterborne bacterial pathogens fall into the group of purple bacteria, which belong to the gamma subdivision of enteric organisms. This group consists of relatively homogeneous Gram-negative bacteria that lack the ability to produce spores, are aerobic, have rod shapes, are oxidase-negative fermenters of glucose, and produce a variety of end products. Another new disease caused by protozoa is Cryptosporidium, which has been the cause of the largest waterborne epidemic to date.

Cryptosporidium is a common intestinal pathogen in dairy cattle, and its sudden presence in water sources is partly due to spring rains and runoff from agricultural lands, increasing the organism's load in water treatment systems. Meanwhile, coagulation-filtration processes were not optimizing effectively, and the removal of turbidity was not feasible. The cysts of this organism are resistant to chlorination, requiring removal through coagulation and filtration methods. As a result, some water treatment processes are undergoing changes to enhance the removal of turbidity through filtration.

Table 1. Some pathogens that are transmitted by water

Disease	Cause of Disease	Source Organism	Symptoms of the Disease
Gastroenteritis	Various pathogens	Animal or human feces	Acute diarrhea and vomiting
typhoid	Salmonella typhoza	Human feces	Intestinal swelling, enlarged spleen, high body temperature, fatal
Microbial diarrhea	Shigella	Human feces	Diarrhea, rarely fatal

cholera	Vibriocoma	Human feces	Vomiting, severe diarrhea, rapid loss of body water and minerals, high mortality
Infectious hepatitis	Virus	Human feces	Yellow skin, enlarged liver, abdominal pain, low mortality, the disease lasts about 4 months
Amoebic diarrhea	Antambahistolitica	Human feces	Mild and chronic diarrhea
Giardiasis	Giardia lamblia	Feces of domestic and wild animals	Diarrhea, dysentery, nausea and general weakness - the disease lasts from 1 to 30 weeks, it is not fatal.
Balantidiasis	Ballantidium coli	Human feces	Bloody diarrhea, similar to diarrhea caused by Antambast

Biochemical oxygen demand (BOD)

The proliferation and abundant reproduction of microbial communities lead to the consumption of dissolved oxygen in water. If bacterial activity increases excessively, the reduction of available oxygen in the water can reach a level where it may result in the death of fish.

An aquatic environment that lacks sufficient oxygen is considered contaminated for organisms that require more oxygen than what is available. The amount of oxygen required for this biochemical breakdown is referred to as Biochemical Oxygen Demand (BOD). BOD, which is a common measurable parameter in water quality management, is measured in milligrams per liter of oxygen consumed over a day at a temperature of 20 degrees Celsius. Approximately 33% of the BOD in aquatic environments, especially in rivers, is related to agricultural activities. When BOD levels are high, dissolved oxygen decreases to a point where it does not support aquatic life (Bouwer & Zehnder, 1993).

According to the definition of the Environmental Quality Council, the pollution alert threshold for water is where dissolved oxygen is less than 5 milligrams per liter. If the amount of organic matter increases and its breakdown occurs rapidly, almost all dissolved oxygen in the water is consumed. In this case, anaerobic fermentations and reductive reactions occur, leading to the production of sulfides, H2S, CH4, and NH3. These reactions mostly occur in flowing waters.

The continuous addition of mineral nutrients derived from organic matter can ultimately lead to the phenomenon of eutrophication in lakes or aquatic environments. In this scenario, the biomass of phytoplankton in lakes or ponds increases, leading to a decrease in water transparency. As a result, plankton accumulates more in the surface layers of the water.

The accumulation of plankton at the water surface increases the amount of organic matter, which in turn leads to an increase in heterotrophic organisms. Consequently, the dissolved oxygen in the water decreases. Thus, following the initial pollution caused by the increase in organic matter input, secondary pollution stemming from internal sources occurs.

Air pollution

Air is essential for life and is needed more than water and food. An average adult breathes approximately 15 kilograms of air in a day, while their

consumption of food and water is about 1.5 and 2.5 kilograms, respectively. The importance of air lies in the fact that a person can survive without food for about 5 weeks and without water for approximately 5 days, but without air, they will not be able to continue living after just a few minutes.

Air is a mixture of various gases, with the majority composed of nitrogen and oxygen. Healthy and natural air typically consists of about 78% nitrogen, 21% oxygen, 0.93% argon, 0.03% carbon dioxide, and very small amounts of gases like neon, helium, krypton, xenon, radon, ozone, hydrogen, and others. Oxygen, in particular, is the most crucial element for the continuation of human life.

The air that is so crucial for human life and whose impact on human health is undeniable, unfortunately, is constantly exposed to pollution due to natural factors, especially human activities. Considering the significance of clean air and the dangers of its contamination, in this section, we will briefly examine the sources and factors of air pollution, the effects of air pollution on humans, plants, animals, and various materials, and methods to combat air pollution.

Air pollution is the presence of one or more pollutants in the ambient air to an extent and duration that alters its quality in a way that is harmful to human health, animals, plants, or structures. The major sources of air pollution include natural and anthropogenic sources. Natural sources often exist without direct human intervention, while anthropogenic sources are human-made and the pollution they cause results from human activities.

Plant and animal sources such as pollen, biological particles, and gases resulting from the decay and fermentation of substances, if released into the surrounding environment, can be effective in polluting the air.

Microorganisms present in the air are divided into two categories:

1. Bacteria: The most important bacteria present in the air are Gram-negative cocci, filamentous bacteria such as spore-forming micrococci, corynebacteria, streptomycetes, and actinomycetes.

2. Fungi: Aspergillus, Penicillium, Fusarium, Cladosporium, yeast fungi

To identify the bacteria, present in the air, the following test is conducted:

First, create a Nutrient agar medium in a sterile Petri dish and expose it to the air without a cover for 48 hours. If Gram-negative cocci or filamentous bacteria like spore-forming bacteria are present in the environment, white colonies will form.

If Micrococcus or Corynebacterium is present in the environment, colored colonies are produced. However, if Streptomyces or Actinomycetes are present, convex and thick colonies are formed. It should be noted that bacteria with pigments in the surrounding air live better and more abundantly because their pigments protect them from the harmful effects of light and UV radiation. Additionally, Gram-positive bacteria, due to their thick and simple cell walls, tend to survive better in the air.

Bacteria in the air do not have any active mechanisms for dispersal in the air and become active in the environment through the following factors. Dust and Particles: Dust and particles facilitate the transport and dispersal of microorganisms in the environment. Fine Water Particles in the Environment cause their dispersion. Dead skin cells shed by humans and animals entering the environment contribute to their dispersal. The most important fungi present in the air are Aspergillus and Penicillium. Similar to bacteria, fungi do not have an active mechanism for dispersal in the environment. Fungi have tiny

and dry spores that are released into the air. These spores are lightweight and are unaffected by temperature and humidity conditions (Zuhara & Isaifant, 2018)

Cladosporium fungi demonstrate their response through two mechanisms: swelling and dormancy, dispersing their spores in the air. Yeast fungi are a group of true yeasts that release their spores in high relative humidity during the night air. Therefore, the majority of fungi present in the night air belong to this type. The highest concentration of fungi in the air during the day is Cladosporium. They are called yeast fungi because when they grow in malt extract agar medium, they give colonies the same appearance regardless of the type of medium used for cultivation.

An important point to note is that the rate of microbial growth is always higher during the night compared to during the day. The reason for this phenomenon is not clear, but it is possible that daytime light has a detrimental effect on the growth of biological organisms.

Soil pollution

From a global perspective, after air and water, soil is considered the third major component of the environment. As long as humans were hunting for a living, there was no need to think about nature or the value of the soil beneath their feet. However, when they shifted from hunting to cultivation and the nature of the soil had a direct impact on their livelihood, they were forced to consider the soil as well.

Over time, as the general perception of the value of soil and the hidden world within it increased, soil acquired a deeper meaning, becoming essential for the survival of millions of hungry people. Although humanity now fully believes that soil is life-giving and the savior of millions of hungry people, excessive exploitation of it, in the name of civilization, has not only polluted the air and water but also led to the contamination of soils (Espinoza & Dendooven, 2003).

Soil pollution is usually the result of unhygienic practices, various agricultural activities, and improper methods of disposing of solid and liquid waste. Additionally, the deposition of air pollutants due to atmospheric precipitation can also contribute significantly to soil pollution. Soil can become contaminated by chemical substances, including heavy metals and petroleum industry by-products, due to severe carelessness. Through this contamination, soil pollutants can enter the food chain, surface waters, or groundwater and eventually enter the human body. In many countries worldwide, especially in industrialized nations, soil pollution by pathogenic microorganisms still holds special significance.

Despite the advancements that have taken place in various fields by humans in recent centuries, large masses of people can still be found near big and modern cities whose quality of life, level of education and awareness, and ultimately their economic and social status have undergone very slight changes. Particularly, their excrement, urine, and other secretions are still in a condition where the cycle of infectious diseases through soil transmission remains preserved. In many parts of the world, due to shortages in the distribution of chemical fertilizers, human excrement is still used as a valuable fertilizer.

In regions where water scarcity is noticeable, the reclamation and reuse of sewage are often used as an additional water source for irrigation purposes. If necessary, precautions are not taken in this regard, this practice can be hazardous to health and hygiene. In some areas where there is not strict monitoring of sewage disposal and raw sewage is still transported, it leads to numerous health problems. For example, one of the causes of the spread of diseases in the Middle East is the consumption of agricultural products and vegetables irrigated with raw sewage. Although in suspicious cases, vegetables are

consumed cooked, one can imagine that surfaces of utensils and kitchens may become contaminated during the preparation of these vegetables, leading to the contamination of other raw food items that are consumed. Therefore, among soil pollutants, what is most concerning is biological contamination, which we will briefly discuss in this chapter.

Soil contamination by pathogenic biological agents

Biological factors that lead to soil contamination and result in human diseases can be divided into the following 3 groups:

1. Pathogenic organisms excreted by humans, which are transmitted to humans through direct contact with contaminated soil or the consumption of fruits and vegetables grown in contaminated soil (human-soil-human transmission). This category includes pathogenic intestinal bacteria, some protozoa, and certain worms such as Ascaris and hookworms. The dissemination of these factors occurs due to the improper disposal of human feces or their use as fertilizer, as well as irrigation of fields with sewage.

As a result, the soil and food products obtained from the fields are contaminated with pathogens such as cholera, typhoid, such as typhoid, and bacillary diarrhea and make humans sick. The transmission to humans occurs through contaminated water, direct person-to-person contact, contaminated food, contact of flies with human feces, and food.

2. Pathogenic organisms from animals that are transmitted to humans through direct contact of individuals with animal excreta-contaminated soil (animal-soil-human transmission). Some common diseases shared between humans and animals, such as leptospirosis, anthrax, Q fever, and migratory worm larvae, for which soil plays a fundamental role in their transmission, fall into this category.

The distribution of leptospirosis is related to specific environmental hygiene conditions, especially involving the animal vector, water, soil, and human contact. Vector animals sometimes excrete the pathogenic agent abundantly through urine, which can survive for weeks in environments such as water or moist soil with a neutral or slightly alkaline pH (Cerqueira et al. 2014).

Infection is more common among individuals who come into contact with animal feces. Children playing on seashores, grassy areas, and play areas where worm larvae are present are at risk. In some cases, soil disinfection is recommended.

3. Pathogenic organisms naturally found in soil can infect humans through direct contact with such contaminated soils (soil-human transmission). The most important diseases in this category include fungi, tetanus, and botulism.

Most fungi that naturally grow as saprophytes in soil or on decaying matter can become pathogenic under specific conditions and attack specific tissues.

Tetanus is an acute disease that can occur due to the toxin produced by the anaerobic growth of the bacterium Clostridium tetani at the site of injuries. The causative agent of tetanus (Clostridium tetani) is excreted through the feces of infected animals, especially horses, and the primary sources of contamination may be soil, dust, human or animal feces, which can lead to disease transmission following bodily injury and contact with these sources. Botulism is often a deadly form of poisoning caused by the toxin produced by the bacterium Clostridium botulinum. The reservoir of the disease agent is soil and the intestines of animals. The toxin is produced as a result of anaerobic spore growth in a food environment, which is considered the main source of poisoning. The disease

usually occurs due to the consumption of canned foods that have not been completely sterilized during preparation or canned foods that have previously come into contact with soil contaminated with Clostridium botulinum. It is important to note that ensuring the absence of contamination in organic matter in the soil before its application will significantly contribute to increasing soil fertility and productivity.

Bioremediation

All organisms grow by utilizing stored energy in organic and inorganic molecules or available radiant energy such as sunlight. To obtain energy, organisms convert chemical substances through oxidation and reduction reactions. Some of this energy is used for organism reproduction. In environmental biotechnology, oxidation/reduction reactions and the production of new biomass by microorganisms remove pollutants (Van Gestel et al, 2003).

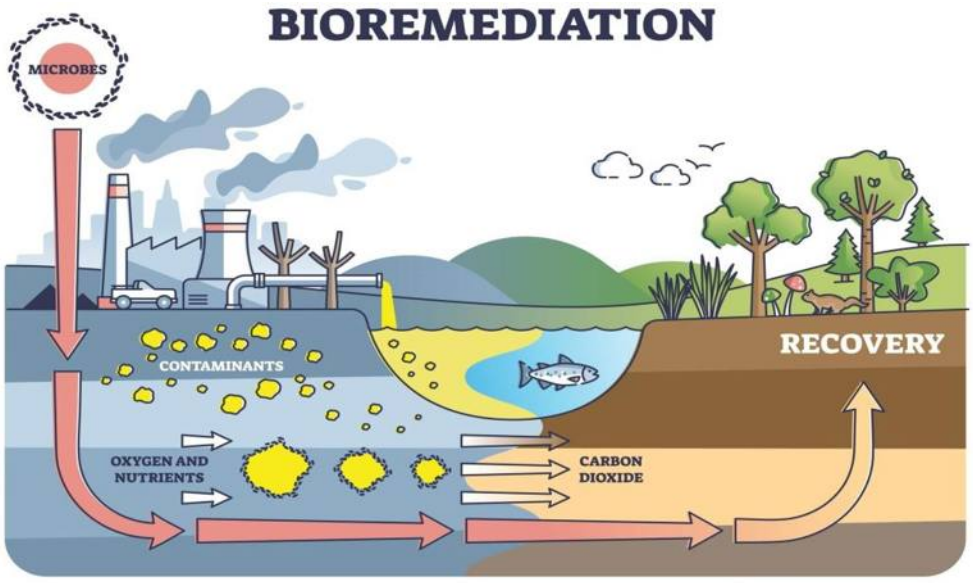


Figure 1. Bioremediation cycle in the ecosystem (Epcmholdings, 2024)

Examples of environmental benefits that can be achieved through microbial systems include:

- Sewage treatment using activated sludge
- Conversion of organic waste into methane as a useful fuel
- Conversion of biodegradable organic matter into harmless inorganic compounds
- Decomposition of toxic pollutants in soil and water

Understanding the energy-producing and consuming reactions of microorganisms can create conditions that result in environmental protection and improvement.

Biogas

The energy crisis and its shortage due to limited oil reserves have prompted scientists to recently compensate for this shortage by utilizing energy sources derived from sunlight, wind, water, atoms, and also biological energies. One of the most successful studies to obtain new and natural energy is the application of animal waste and organic material residues, which has now resulted in the presentation of biogas as very simple and cost-effective methods.

In many developing countries and even in many parts of Iran, the issue of fuel scarcity has always been present. For example, rural populations have dealt with very simple and basic issues to sustain their livelihoods, and the dispersion of population centers and the lack of reliable communication pathways have

exacerbated their problems, including energy shortages. Additionally, while electricity shortages still persist for industrial centers in the country, in many Iranian villages, heating, cooking, and lighting are often provided through the burning of oil and gas, and many also fulfill their energy needs by burning animal waste or firewood (Atlas & Bartha, 1973).

Although all organic biological materials have the capability to ferment and produce biogas, animal and human waste are more suitable for this process. Therefore, in areas where animal husbandry is possible, such as villages, farms, and poultry farms, some of the required energy can be obtained by fermenting animal and human waste.

The fermentation process takes place in tanks called digesters, and on average, about 150 liters of biogas is produced per cubic meter of useful volume in a digester. The retention time of biological materials in the digester, or in other words, the time required for the reaction to complete, varies from 30 to 90 days depending on the ambient temperature.

In addition to creating energy, biogas has other important advantages, the most important of which are:

1. Preserving forests is important because the substitution of biogas for firewood eliminates the need to cut down trees for firewood supply. The biogas produced provides more energy compared to directly burning these materials.
2. Burning gas is significantly simpler than burning firewood; additionally, it does not produce smoke, which means air pollution is not a concern. Moreover, there is no need to collect or cut firewood, thus requiring less human labor for energy production.
3. The fermented materials from the fermentation tank are rich in nitrogen and phosphorus, and not only do they retain the fertilizing properties of animal waste, but they also become denser and richer. The raw fermented materials create an unfavorable environment for the growth of mosquitoes, flies, and various parasites.
4. Due to the non-burning of plant waste such as tree branches, straw, and rice husks, livestock farming will also benefit, as these materials can be utilized as fodder and animal feed.
5. Weed seeds present in animal manure are destroyed during fermentation, so using fermented materials as fertilizer will not lead to the growth of unwanted plants.
6. The production and consumption of biogas will result in significant savings in the use of other forms of energy, such as oil and electricity, which in turn will enable energy supply to more areas.

Biological treatment of sewage using Activated Sludge method

Biological treatment of sewage using activated sludge was first developed in 1913 in Manchester by Anderson and Lockett, and soon this method was adopted in other countries. Today, activated sludge treatment is considered the most important and fundamental unit in sewage treatment plants. In this method, sewage is introduced into a basin where the retention time is approximately 6 to 8 hours. In this basin, a large number of active microorganisms in the form of activated sludge is added, and the required oxygen is continuously supplied through aeration. In this basin, both soluble and insoluble organic materials are decomposed, converting them into carbon dioxide, water, and occasionally ammonia. If the basin is well-designed, about 90 to 95 percent of the organic materials will be removed from the sewage.

The following factors can be mentioned to ensure biological treatment using activated sludge:

1. The activated sludge rich in microorganisms must be sufficiently present.
2. A sufficient surface area of sewage should be in contact with air.
3. Adequate mixing and agitation occur during aeration and increase of activated sludge.
4. The aeration time of the mixture of sewage and activated sludge must be sufficient.

The mixture of sewage and activated sludge is then directed to a secondary settling basin. In this basin, the microorganisms and digested organic materials settle out, with a portion of the resulting sludge being returned to the activated sludge basin to maintain the active sludge, while the excess is disposed of. The remaining effluent in the upper part of the settling basin is also directed to the disinfection basin for final disposal. Below are some of the advantages and disadvantages of this method (Makadia et al, 2011).

Some disadvantages of biological treatment using activated sludge compared to similar methods include the following:

1. Activated sludge treatment requires constant maintenance and, consequently, the employment of skilled and knowledgeable personnel. Therefore, in cities where it is difficult to find qualified individuals, the use of this method is not advisable.
2. The flexibility of the treatment plant is lower, meaning that changes in the quantity and quality of incoming wastewater also affect the degree of treatment.
3. The storage tanks required for this method are extensive.
4. Dewatering the sludge produced by this method is generally more challenging.

The role of microorganisms in removing oil pollution from water

The battle against oil pollution has been a significant part of scientific research since the emergence of this dark yet valuable substance. While it received much less attention in the past, it is increasingly capturing the interest of specialists and experts today. Among the proposed solutions that yield better and faster results, the use of microorganisms is a method widely adopted in most developed countries, known as bioremediation or biodegradation.

Crude oil, with over 340 products, is one of the main sources of energy and a driving force in the global economy, with Iran holding 9 percent of the world's total oil reserves. Crude oil is a complex mixture of hundreds of different compounds, including hydrocarbons, nitrogen, sulfur, and vanadium, with the hydrocarbon portion comprising aromatic, aliphatic, and asphaltene compounds. Oil pollution is almost an unavoidable consequence of rapid population growth and energy consumption based on oil technology. In recent years, experts' attention has primarily focused on oil pollution in the oceans caused by tanker accidents, the largest of which occurred in 1967 in the waters off England (Moslemi et al,2005).

In 1975, approximately one thousand gallons of crude oil leaked from a storage tank in North Carolina into the sea. Additionally, in 1991, over 5 tons of crude oil were spilled into the waters of the Persian Gulf, leading to the destruction of coastal plants and ecosystems. Due to the passage of oil tankers, the drilling of multiple wells, and oil extraction, the Persian Gulf contains about 160,000 tons of oil and petroleum materials annually, making it one of the most polluted seas in the world. Generally, the events mentioned have led to increased attention toward developing various methods for removing oil pollution from the environment, the most important of which include:

1. Manual collection of oil pollution from the water surface.
2. Containment of oil pollution using physical barriers.

3. Utilization of materials such as feathers and straw that absorb oil particles.
4. Burning.
5. Use of biphasic solvents.
6. Bioremediation or biodegradation.

Cleanup or biodegradation

Twenty-five percent of the oil released into water is eliminated through evaporation, while the rest is broken down by photooxidation and microorganisms, a process known as bioremediation. The presence of hydrocarbon-degrading microorganisms in seawater and soils has made biodegradation one of the most effective methods for removing oil pollution. Bioremediation accelerates the use of biological systems to destroy or reduce the concentration of toxic substances, such as petroleum hydrocarbons. This process is enhanced in the presence of oxygen and nutrients, particularly nitrogen and phosphorus. The products of biodegradation are typically CO2 and small organic compounds with very low toxicity.

Sulfur combined with oil produces SO2 when burned. Generally, the heavier the fossil fuels, the more SO2 is produced from their combustion. For example, burning one ton of coal with a certain percentage of sulfur generates 38 kilograms of SO2. This gas, after being released into the atmosphere, forms compounds that return to the ground as acid rain. Such rains create numerous problems for agricultural lands and forest and aquatic ecosystems. Given the severe pollution that sulfur-containing compounds cause for the environment, environmental organizations impose special restrictions on oil refining industries (Atlas & Bartha, 1993).

Desulfurization operations and biological methods

Historically, desulfurization operations were carried out using chemical methods. Chemical desulfurization imposes significant costs on the oil industry and, on the other hand, these methods cannot remove all the sulfur present in oil. For this reason, scientists in the fields of oil and environmental science have long been considering ways to enhance this process. The idea of separating sulfur using biological methods emerged nearly fifty years ago, particularly with the discovery of microorganisms capable of extracting sulfur from petroleum compounds. Research in this area has been extensive (Das & Murkherjee, 2007).

It should be noted that currently, the exclusive use of biological methods for desulfurization is not cost-effective. Since a significant percentage of sulfur can be removed using more economical chemical methods, it is wiser to utilize biological methods as a complement to chemical ones. When these two methods are used in conjunction, operational costs can be significantly reduced.

Removal of heavy metals using microorganisms

Heavy metals are classified into three categories based on bioaccumulation: toxic metals (such as Hg, Pb, Zn, Cr, Cd, As, Co, Sn, etc.), precious metals (such as Pd, Pt, Ag, Au, etc.), and radionuclides (such as U, Ra, Am, etc.), which typically have a specific gravity greater than 5 grams per cubic centimeter. Lead is a soft, heavy metal with a bluish-gray color. It is introduced into the environment by various industries, including ceramics, glassmaking, textiles, battery production, and the manufacture of lead bullets for printing types. Lead enters the human body through air, water, and food. The effects and symptoms of lead poisoning appear to be related to its ability to bind to the sulfhydryl groups of various enzymes necessary for heme production, thereby inhibiting this process. Additionally, lead inactivates pyrimidine 5-nucleotidase (which is involved in RNA breakdown), resulting in the accumulation of ribosomal RNA. Lead also prevents the production of 1 and 25-dihydroxyvitamin D.

The first organs affected by lead exposure include the brain, peripheral nervous system, bone marrow, kidneys, and liver. Due to increasing consumption and high intrinsic toxicity, heavy metal pollution has become one of the most significant environmental challenges today. Conventional methods for removing metal ions from liquid solutions have been extensively studied, including chemical precipitation, ion exchange, electrochemical treatment, membrane technologies, and adsorption on activated carbon, among others (Schaefer & Juliane, 2007).

The adsorption of heavy metals by microbial cells results from biosorption and bioaccumulation mechanisms. The term biosorption refers to the ability of living, inactive, and dead biomass to bind to heavy metals or pollutants present in dilute solutions. This property is primarily attributed to the cell wall. The term bioaccumulation pertains to the metabolic uptake of substances by actively living cells. It has been reported that the bioaccumulation of heavy metals in yeast cells occurs in two stages. The first stage is rapid and independent of metabolism, requiring binding to the cell wall surface. In most cases, the metal-binding capacity of Saccharomyces cerevisiae and fungi is attributed to the electric charge resulting from the weak dissociation of acidic carboxyl groups and other functional groups, such as amino groups, that constitute the cell wall. The second stage is slower and metabolism-dependent, involving the accumulation of larger amounts of metal cations compared to biosorption by inactive biomass. However, heavy metals are toxic to microorganisms. Their high affinity for forming complexes with membrane components can damage membrane integrity and reduce functionality. Yeasts are preferred over other microorganisms for the removal of heavy metals due to their ability to survive and grow in metal-contaminated environments, their high metal-binding capacity to the cell wall, and their significant intracellular absorption rates.

Biological treatment of wastewater containing toxic metal zinc (Zn2+) by seaweed

Metals such as nickel, cadmium, lead, copper, and zinc contaminate the environment through industrial activities. Therefore, wastewater pollution by toxic metal ions is not merely a problem; the accumulation of these toxic heavy metals in fertile agricultural soils renders them unusable, primarily due to the bioaccumulation of these metals by plants and their subsequent entry into the food chain. The most common physical and chemical methods for separating these metals include sedimentation, chemical oxidation and reduction, ion exchange, reverse osmosis, membrane separators, electrochemical reactions, and evaporation. Human concerns increase when existing treatment methods for such wastewater fail to comply with environmental standards, as many of these methods are ineffective or uneconomical when heavy metal concentrations in contaminated environments range from 10 to 100 ppm, while permissible concentrations are below 1 ppm. In recent decades, extensive research has been conducted on the binding of metals by bacteria, yeasts, fungi, and algae. As a result, biosorption, particularly the uptake of toxic metals by algae, can be an effective alternative for large volumes with low contamination levels of toxic metals. Alginate plays a key role in the absorption of heavy and toxic metals, constituting about 10% to 40% of the dry weight of the algal cell wall. The biosorption mechanism by living and dead biomass, bacteria, polysaccharides, and various biological products has been studied. The aim of this research is to investigate the biological treatment efficiency of wastewater containing zinc using the brown algae Fucus and the impact of physical factors on zinc absorption (Broda. P, 1992).

Conclusion

In the future, countries will face crises related to water, soil, and air pollution due to the increase in urban populations and the advancement of

industry and agriculture. The use of modern methods for environmental purification has become a focus due to limited resources. Fecal pollution and the introduction of oil spills into water, the presence of pesticides and herbicides in soil, and the creation of biological contamination in its surface layers, as well as air pollution caused by fungi, bacteria, and others, have increased significantly today.

In the past, physical methods such as ion exchange, electrodialysis, and reverse osmosis, as well as chemical methods like chemical reduction, electrolysis, and ion exchange, were commonly used. However, due to their relatively low efficiency, high costs, and other associated issues, alternative methods have now replaced these approaches. Biological methods have emerged as a modern solution for environmental pollution remediation. This method involves the use of fungi, algae, bacteria, yeast, and plant cells to remove pollution. Considering that Iran has been making significant strides in biotechnology in recent years, it seems rational to utilize biotechnology as a supporting tool in large-scale environmental programs in the country.

Now, it is crucial for universities to seriously engage in biotechnology research alongside new developments in engineering and sciences. This will allow us to pass on the frontiers of contemporary knowledge to future generations and contribute to the emerging structures of existence. We must awaken promptly, appreciate the profound miracles of human thought, and move away from short-sightedness and outdated ideas.

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НОСТАЦИОНАР ИССИҚЛИК УЗАТИШНИНГ ИККИ ЎЛЧОВЛИ МАСАЛАЛАРИНИ ЕЧИШ УЧУН ДИФФЕРЕНЦИАЛ-АЙИРМАЛИ УСУЛ

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АННОТАЦИЯ

Тўғри ва тескари қувиш (прогонки) жараёнлари алоҳида йўналишларда амалга ошириладиган усулларнинг умумий камчиликлари турли йўналишларда натижаларнинг номувофиқлигидир. Ҳақиқатан ҳам, маълум бир йўналишда (координата ўқида) тенгламаларни аппроксимациялаганда изланаётган қўшни қатламларнинг қийматлари олдинги яқинлашишдан ёки вақт қатламидан олинади. Шу муносабат билан, предикор-корректор усулидан фойдаланган ҳолда ҳам вақт қадами учун якуний ечим аниқ ечим эмас, балки унга қандайдир яқинлашишувчи ечим олинади. Буларга чекли айирмали яқинлашувнинг номувофиқлигига қўшни қатламларда изланаётган қийматларнинг тақрибий қийматларидан фойдаланиш сабабли пайдо бўладиган ноаниқликлар қўшилади.

Калит сўзлар: Аппроксимация, Чекли айирмалар усули, Иссиқлик узатиш, Ностационар, Дифференциал-айирмали усул.

КИРИШ

Изланаётган функциянинг қийматлари биринчи Декарт координатаси чегараларида (биринчи жинсли чегаравий шартлари) ва иккинчи координата чегараларида биринчи, иккинчи ва учинчи жинсли шартларнинг ихтиёрий комбинациясида берилганда икки ўлчовли параболик тенгламаларни ечишнинг сонли усулини таклиф қиламиз. Бу усул алоҳида координаталар бўйича қувиш натижаларининг изчиллигини таъминлайди. Биз параболик тенгламани кўриб чиқиш билан чекланамиз.

МЕТОДОЛОГИЯ

Масаланинг қўйилиши. Икки ўлчовли иссиқлик узатиш жараёни

$$\frac{\partial T}{\partial t} = a^2\left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2}\right) + f(x,y,t), \qquad (1)$$

тенглама билан тавсифланади, бу ерда $f(x,y,t)$ – иссиқлик сиғими ва материал зичлиги кўпайтмаси бўйича келтирилган (x,y) нуқтадаги ички ва ташқи иссиқлик манбаларининг интенсивлиги.

Ҳисоблаш соҳасида бошланғич ҳарорат тақсимоти

$$T(x,y,0)=T^0(x,y), \tag{2}$$

x ўқи учун

$$T(0,y,t)=\mu_0(y,t), \quad T(l_x,y,t)=\mu_l(y,t) \tag{3}$$

ва y ўқи учун

$$\theta_0\frac{\partial T(x,0,t)}{\partial y}+\eta_0 T(x,0,t)=\varphi(x,t), \quad \theta_l\frac{\partial T(x,l_y,t)}{\partial y}+\eta_l T(x,l_y,t)=\psi(x,t) \tag{4}$$

чегаравий шартлар берилган.

Икки координата йўналиши бўйича ечимларнинг ўзаро мослигини таъминлайдиган сонли усулни ишлаб чиқиш талаб этилади.

Масалани ечишнинг дифференциал-айирмали усули. x ва y бўйича текис тўр:

$$\omega_x=\left(x_i=ih_x,\ \ i=0,...,N_x+1;\ \ h_x=\frac{l_x}{N_x+1}\right),$$

$$\omega_y=\left(y_j=jh_y,\ \ j=0,...,N_y+1;\ \ h_y=\frac{l_y}{N_y+1}\right),$$

шунингдек, вақт бўйича текис ёки нотекис қадам $\tau_n=t_n-t_{n-1}$ киритилади. Изланаётган $u_{i,j}^n$ тўр функцияси ва $f_{i,j}^n$, $\mu_{0,j}^n$, $\mu_{l,j}^n$... функцияларини киритамиз.

Дастлаб j $(0<j<N_y+1)$ нинг муайян қиймати учун x функция бўйича ички тугунларда тенгламани иккинчи тартибли аниқлик билан яқинлаштирамиз:

$$\frac{\partial u_{i,j}^n}{\partial t}=\frac{a^2}{h_x^2}\left(u_{i+1,j}^n-2u_{i,j}^n+u_{i-1,j}^n\right)+a^2\frac{\partial^2 u_{i,j}^n}{\partial y^2}+f_{i,j}^n.$$

$i=1$ ва $i=N_x$ хусусий ҳолларда масаланинг чегаравий шартлари амалга оширилади:

$$\frac{\partial u_{1,j}^n}{\partial t}=\frac{a^2}{h_x^2}\left(u_{2,j}^n-2u_{1,j}^n+\mu_{0,j}^n\right)+a^2\frac{\partial^2 u_{1,j}^n}{\partial y^2}+f_{1,j}^n,$$

$$\frac{\partial u_{N_x,j}^n}{\partial t}=\frac{a^2}{h_x^2}\left(\mu_{l,j}^n-2u_{N_x,j}^n+u_{N_x-1,j}^n\right)+a^2\frac{\partial^2 u_{N_x,j}^n}{\partial y^2}+f_{N_x,j}^n$$

Биз охирги учта ёзувни матрица шаклида ёзамиз:

$$\frac{\partial U_j^n}{\partial t}=\frac{a^2}{h_x^2}AU_j^n+a^2\frac{\partial^2 U_j^n}{\partial y^2}+F_j^n, \tag{5}$$

Бу ерда

$$A=\begin{Vmatrix} -2 & 1 & 0 & 0 & \dots & 0 & 0 & 0 \\ 1 & -2 & 1 & 0 & \dots & 0 & 0 & 0 \\ 0 & 1 & -2 & 1 & \dots & 0 & 0 & 0 \\ & \dots & & & \dots & & \dots & \\ 0 & 0 & 0 & 0 & \dots & -2 & 1 & 0 \\ 0 & 0 & 0 & 0 & \dots & 1 & -2 & 1 \\ 0 & 0 & 0 & 0 & \dots & 0 & 1 & -2 \end{Vmatrix}_{N_x},$$

$$U_j^n=\left(u_{1,j}^n, u_{2,j}^n,\dots, u_{N_x-1,j}^n, u_{N_x,j}^n\right)^T,$$

$$F_j^n=\left(f_{1,j}^n+\frac{a^2}{h_x^2}\mu_{0,j}^n, f_{2,j}^n,\dots, f_{N_x-1,j}^n, f_{N_x,j}^n+\frac{a^2}{h_x^2}\mu_{l,j}^n \right)^T.$$

Бу ерда ва кейин $(\dots)^T$ матрицанинг транспонирлашни билдиради.

Биз A матрицасини $A=V\Lambda V^{-1}$ шаклда ифодалаймиз, бу ерда Λ диагонал матрицанинг элементлари $\lambda_s=-2\left(1+\cos\frac{\pi s}{N_x+1}\right)$, V фундаментал матрица элементлари эса $v_{s,p}=(-1)^{s+p}\sqrt{\frac{2}{N_x+1}}\sin\frac{\pi sp}{N_x+1}$ кўринишга эга; V^{-1} $(=V)$ – V га тескари матрица.

(4.5) тенгламанинг иккала томонини чапдан V^{-1} га кўпайтирамиз,

$$\frac{\partial V^{-1}U_j^n}{\partial t}=\frac{a^2}{h_x^2}V^{-1}AU_j^n+a^2\frac{\partial^2 V^{-1}U_j^n}{\partial y^2}+V^{-1}F_j^n \qquad (6)$$

Янги изланаётган $\bar{U}_j^n=V^{-1}U_j^n$ вектор функцияни, $\bar{F}_j^n=V^{-1}F_j^n$ вектор функциясини киритамиз ва $V^{-1}AU_j^n=\Lambda\bar{U}_j^n$ айниятни ҳисобга оламиз.

У ҳолда (4.6) тенглама қуйидаги шаклни олади:

$$\frac{\partial \bar{U}_j^n}{\partial t}=\frac{a^2}{h_x^2}\Lambda\bar{U}_j^n+a^2\frac{\partial^2\bar{U}_j^n}{\partial y^2}+\bar{F}_j^n,$$

бу эса

$$\frac{\partial \bar{u}_{i,j}^n}{\partial t}=\frac{a^2}{h_x^2}\lambda_i\bar{u}_{i,j}^n+a^2\frac{\partial^2\bar{u}_{i,j}^n}{\partial y^2}+\bar{f}_{i,j}^n \qquad (7)$$

автоном тенгламалардан иборатдир.

Киритилган алмаштиришлар ва $V^{-1}=V$ айниятга кўра, бу ерда

$$\bar{u}_{i,j}^n=\sum_{p=1}^{N_x}v_{i,p}u_{p,j}^n,\quad \bar{f}_{i,j}^n=v_{i,1}\frac{a^2\mu_{0,j}^n}{h_x^2}+v_{i,N_x}\frac{a^2\mu_{l,j}^n}{h_x^2}+\sum_{p=1}^{N_x}v_{i,p}u_{p,j}^n.$$

Шунинг учун бошланғич шарт $\bar{u}_{i,j}^0=\sum_{p=1}^{N_x}v_{i,p}T_{p,j}^0$ ва чегаравий шартлар $\theta_0\frac{\partial\bar{u}_{i,0}^n}{\partial y}+\eta_0\bar{u}_{i,0}^n=\bar{\varphi}_i^n\equiv\sum_{p=1}^{N_x}v_{i,p}\varphi_p^n$, $\theta_l\frac{\partial\bar{u}_{i,N_y+1}^n}{\partial y}+\eta_l\bar{u}_{i,N_y+1}^n=\bar{\psi}_i^n\equiv\sum_{p=1}^{N_x}v_{i,p}\psi_p^n$ кўринишга эга.

j бўйича ички тугунлар учун (7) тенглама иккинчи тартибили ошкормас схема бўйича аппроксимацияланади:

$$\frac{\bar{u}_{i,j}^n-\bar{u}_{i,j}^{n-1}}{\tau_n}=\frac{a^2}{h_x^2}\lambda_i\bar{u}_{i,j}^n+\frac{a^2}{h_y^2}\left(\bar{u}_{i,j+1}^n-2\bar{u}_{i,j}^n+\bar{u}_{i,j-1}^n\right)+\bar{f}_{i,j}^n\ .$$

Тенгламанинг томонларини τ_n га кўпайтирамиз ва ихчамлаймиз:

$$a_j\bar{u}_{i,j+1}^n-b_j\bar{u}_{i,j}^n+c_j\bar{u}_{i,j-1}^n=d_j,$$

бу ерда $a_j=c_j=\sigma_y=\frac{\tau_n a^2}{h_y^2}$, $\sigma_x=\frac{\tau_n a^2}{h_x^2}$, $b_j=1+2\sigma_y-\sigma_x\lambda_i$, $d_j=-\tau_n\bar{f}_{i,j}^n-\bar{u}_{i,j}^{n-1}$,

$\bar{u}_{i,j-1}^n=\alpha_{j-1}\bar{u}_{i,j}^n+\beta_{j-1}$ деб фараз қилсак, $a_j\bar{u}_{i,j+1}^n-\left(b_j-c_j\alpha_{j-1}\right)\bar{u}_{i,j}^n=d_j-c_j\beta_{j-1}$ га эга бўламиз. Бу ердан $1\le j\le N_y$ лар учун қувиш коэффициентларининг қийматларини топамиз:

$$\alpha_j=\frac{a_j}{b_j-c_j\alpha_{j-1}},\quad \beta_{j-1}=\frac{c_j\beta_{j-1}-d_j}{b_j-c_j\alpha_{j-1}}.\qquad(8)$$

$y=0$ да тўғри қувиш бошланадиган коэффициентларнинг қийматларини аниқлашимиз лозим. $y=0$ да учинчи жинсли чегаравий шартлар учун ($\theta_0\neq0,\ \eta_0\neq0$) аппроксимация аниқлигининг иккинчи тартибини ҳам таъминлаймиз:

$$\theta_0\frac{-3\bar{u}_{i,0}^n+4\bar{u}_{i,1}^n-\bar{u}_{i,2}^n}{2h_y}+\eta_0\bar{u}_{i,0}^n=\bar{\varphi}_i^n$$

$\bar{u}_{i,2}^n$ қийматни $a_1\bar{u}_{i,2}^n-b_1\bar{u}_{i,1}^n+c_1\bar{u}_{i,0}^n=d_1$ тенгликдан топамиз:

$$\bar{u}_{i,2}^n=\frac{d_1+b_1\bar{u}_{i,1}^n-c_1\bar{u}_{i,0}^n}{a_1}.$$

Уни олдинги тенгламага қўямиз ва

$$\left(-3\theta_0 a_1+\theta_0 c_1+2h_y a_1\eta_0\right)\bar{u}_{i,0}^n+\theta_0\left(4a_1-b_1\right)\bar{u}_{i,1}^n=\theta_0 d_1+2a_1h_y\bar{\varphi}_i^n$$

тенгламани оламиз. Бундан

$$\alpha_0=\frac{\left(4a_1-b_1\right)\theta_0}{\left(3a_1-c_1\right)\theta_0-2h_y a_1\eta_0},\quad \beta_0=\frac{-\theta_0 d_1-2a_1h_y\bar{\varphi}_i^n}{\left(3a_1-c_1\right)\theta_0-2h_y a_1\eta_0} \tag{9}$$

келиб чиқади.

Хусусий ҳолда, биринчи турдаги чегаравий шартлар ($\theta_0=0,\ \eta_0=1$) учун $\alpha_0=0,\quad \beta_0=\bar{\varphi}_i^n$ га эга бўламиз.

Иккинчи турдаги чегаравий шартлар учун ($\theta_0=1,\ \eta_0=0$) умумий ҳолдан қуйидагилар келиб чиқади: $\alpha_0=\dfrac{4a_1-b_1}{3a_1-c_1},\quad \beta_0=\dfrac{-d_1-2a_1h_y\bar{\varphi}_i^n}{3a_1-c_1}.$

α_0 ва β_0 қийматлар (4.9) формулалар билан аниқлангандан сўнг $1\le j\le N_y$ лар учун $\alpha_j,\ \beta_j$ лар (4.8) формулалар бўйича ҳисобланади. олинган $\alpha_j,\ \beta_j$ ва чегаравий шартларга кўра $\bar{u}_{i,N_y+1}^n$ қийматлар аниқланади.

$y=l_y$ даги учинчи жинсли шарт $\theta_l=1,\ \eta_l\neq 0$ даги (4.4) даги иккинчи шарт ҳам аниқликнинг иккинчи тартиби билан аппроксимацияланади:

$$\frac{\theta_l}{2h_y}\left(3\bar{u}_{i,N_y+1}^n-4\bar{u}_{i,N_y}^n+\bar{u}_{i,N_y-1}^n\right)+\eta_l\bar{u}_{i,N_y+1}^n=\bar{\psi}_i^n\ .$$

Бу ерда $\bar{u}_{i,N_y-1}^n=\alpha_{N_y-1}\bar{u}_{i,N_y}^n+\beta_{N_y-1}$. Шунинг учун

$$\left(3\theta_l+2h_y\eta_l\right)\bar{u}_{i,N_y+1}^n-\left(4\theta_l-\theta_l\alpha_{N_y-1}\right)\bar{u}_{i,N_y}^n=2h_y\bar{\psi}_i^n-\theta_l\beta_{N_y-1}.$$

$\bar{u}_{i,N_y}^n=\alpha_{N_y}\bar{u}_{i,N_y+1}^n+\beta_{N_y}$ ни ҳисобга оламиз. У ҳолда

$$\left[3\theta_l+2h_y\eta_l-\theta_l\left(4-\alpha_{N_y-1}\right)\alpha_{N_y}\right]\bar{u}_{i,N_y+1}^n=2h_y\bar{\psi}_i^n-\theta_l\beta_{N_y-1}+\theta_l\left(4-\alpha_{N_y-1}\right)\beta_{N_y}.$$

Бундан

$$\bar{u}_{i,N_y+1}^n=\frac{2h_y\bar{\psi}_i^n-\theta_l\left[\beta_{N_y-1}-\left(4-\alpha_{N_y-1}\right)\beta_{N_y}\right]}{2h_y\eta_l+\theta_l\left[3-\left(4-\alpha_{N_y-1}\right)\alpha_{N_y}\right]}$$

тенглик келиб чиқади. Бу формуладан $\theta_l=0,\ \eta_l=1$ да $y=l_y$ даги биринчи жинсли чегаравий шартлар учун $\bar{u}_{i,N_y+1}^n=\bar{\psi}_i^n$ оддий формула ҳосил бўлади.

Иккинчи жинсли чегаравий шартлар учун эса $\theta_l = 1,\ \eta_l = 0$ да

$$\bar{u}^n_{i,N_y+1} = \frac{2h_y\bar{\psi}^n_i - \left[\beta_{N_y-1} - \left(4 - \alpha_{N_y-1}\right)\beta_{N_y}\right]}{3 - \left(4 - \alpha_{N_y-1}\right)\alpha_{N_y}}.$$

тенгликка эга бўламиз.

$i = 1..N_x$ кесимлар учун тўғри ва тескари қувиш амалга оширилади.

$V = V^{-1}$ айният ҳисобга олинган ҳолда u^n_i га тескари ўтиш $i = 1..N_x$ ва $j = 0..N_y + 1$ да $u^n_{i,j} = \sum_{p=1}^{N_x} v_{i,p}\bar{u}^n_{p,j}$ формула бўйича амалга оширилади.

Биз таклиф қилган усул доирасида ечиладиган алоҳида масалаларга мурожаат қиламиз ва сонли натижаларни муҳокама қиламиз.

Тенглама ва чегаравий шартларни яқинлаштирганда координаталар бўйича $O\left(h_x^2 + h_y^2\right)$ иккинчи тартибли аниқликни таъминладик. Тақдим этилган материал вақт бўйича $O\left(\max_n\{\tau_n\}\right)$ аниқликнинг биринчи тартибини таъминлайди. Лекин чекли-айирмали тенгламанинг (7) ўнг томонини вақт бўйича n -инчи ва n-1-чи қадамлари учун ифодаларнинг ўрта арифметик қиймати билан ифодалаш орқали унинг тартибини ошириш имконияти мавжуд.

ХУЛОСА

Параболик тенгламани сонли ечиш учун таклиф қилинган усулнинг муваффақияти шундан иборатки, муайян t вақтда x координата бўйлаб ҳам, y координата бўйлаб ҳам аппроксимациялашда тўр функциялари ёки уларнинг чизиқли комбинацияларининг бир хил қийматларидан фойдаландик. Яъни, вақт ўтиши билан тўпланиб қоладиган қўшни қатламлардаги чекли айирмали тенгламаларида қўлланиладиган тўр функцияларнинг номувофиқлигидан келиб чиқадиган хатоликлар бартараф этилди. Охир оқибат, ҳисоб-китобларнинг аниқлиги яқинлашишнинг $O\left(\tau_{n\max} + h_x^2 + h_y^2\right)$ ва машина яхлитлашларининг аниқлиги билан баҳоланади. Қадамларнинг қийматлари бошланғич ва чегаравий шартларнинг табиатига қараб танланади.

τ_n вақт қадамининг ўзгарувчанлиги ўрнатилиш жараёнида τ_n ни арифметик прогрессия ёки бошқа шаклда олиниши билан боғлиқ. Бунинг ўрнига $\partial T / \partial t = 0$ деб қабул қилиш орқали эллиптик тенгламага ўтиш мумкин. Агар тенгламанинг ўнг томони ва чегаравий функциялари вақтга боғлиқ бўлмаса, у ҳолда

юқорида келтирилган материалга асосланиб алгоритм қуриш мумкин, у ҳолда масала кетма-кет яқинлашишларни ишлатмасдан ёки фиктив вақтни киритмасдан бир босқичда ечилади. Агар тенгламанинг ўнг томони ва чегаравий функциялари вақтга боғлиқ бўлса, у ҳолда t вақт параметр сифатида ечимда иштирок этади ва ҳар бир алоҳида t_n қийматлар учун дифференциал-айирмали усулни қўллаш якуний натижани беради.

Алгоритм гиперболик типдаги тенгламалар учун мос тузатишлар билан мослаштирилиши мумкин. Бундай ҳолда, машинани яхлитлаш чегараларидаги $O\left(\tau_{n\max} + h_x^2 + h_y^2\right)$ аниқлик таъминланади.

Агар x координата бўйича шартлардан бирини иккинчи турдаги шарт билан алмаштирилса, ечиладиган масалалар доирасини кенгайтириш мумкин. Бундай ҳоллар учун λ_s, $\nu_{s,p}$, $\nu_{s,p}^-$ лар қийматлари келтирилган.

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MAHSULOTLARNI QAYTA ISHLASHDA INFRAQIZIL NURLANISHNING SAMARADORLIK TA'SIRI

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ANNOTATSIYA

Quritish jarayonida foydalaniladigan asosiy manba, issiq havo hisobidan amalga oshirilib kelinmoqda. Bu esa quritilgan mahsulotlarning tannarxini ortib ketishi, inson salomatligiga turli ziyonlar yetkazilishi, quritilgan mahsulotning tarkibidagi foydali vitaminlarning yo'qotilishiga sabab bo'lmoqda. Mahsus keramika qoplangan kvars nay orqali infraqizil nurlanish ta'sirida mahsulotlarni quritish esa, yuqorida keltirilgan qator kamchiliklarni bartaraf etishga xizmat qiladi. Mahsus keramika qoplangan kvars naydan tarqalayotgan impulsli infraqizil nurlanish mahsulot tarkibidagi suvning tabiiy bug'lanishiga sabab bo'ladi. Tadqiqot natijalari asosida turli qishloq ho'jalik mahsulotlari, sabzovotlar kartoshka, sabzi va piyozni qayta ishlash natijalari tahlil qilingan. Tahlillar quritish tezligi, quritish qalinligi, quritish vaqtining texnik kattaliklariga ta'siri keltirilgan. Qurilmada kechadigan fizikaviy jarayonlar, bug'lanish va uning mahsulotlarga ta'siri, namlikning tabiiy holatda yuqoriga xarakatlanishi asoslangan. Ejektor tizimining afzalliklari, mahsulotning sifatli qurishiga, mahsulot tarkibining saqlanishiga xizmat qilishi ko'rsatilgan. Qurilmada joylashgan termopara ko'rsatkichlari, quritish jarayonidagi atmosferani ta'minlashi, mahsulotlarning bir tekis qurishi, mahsulotlarning tashqi ko'rinishiga ziyon yetkazilmasligi, qurish vaqtining cho'zilmasligini ta'minlaydi. Elektr kuchlanishni avtomatik boshqarish tizimi qurilmaning belgilangan vaqtlar davomida mahsulotlarni intensiv qurishiga xizmat qiladi.

Kalit so'zlar: quritish, issiq havo, quritilgan mahsulot, inson salomatligi, vitamin, keramika, kvars nay, infraqizil nurlanish, bug'lanish.

ABSTRACT

The main source used in the drying process is hot air. This causes an increase in the price of dried products, various damage to human health, and the loss of useful vitamins contained in dried products. Drying products under the influence of infrared radiation through a special quartz tube with a ceramic coating allows eliminating a number of the above-mentioned disadvantages. Pulsed infrared radiation emitted by a special

quartz tube with a ceramic coating causes natural evaporation of water contained in the product. Based on the research results, the results of processing various agricultural products, vegetables, potatoes, carrots and onions were analyzed. The analysis of the influence of drying speed, drying thickness and drying time on technical parameters is given. It is based on the physical processes occurring in the device, evaporation and its effect on products, upward movement of moisture in a natural state. It is shown that the advantages of the ejector system are the quality of the product and the preservation of the product composition. Thermocouple indicators located in the device guarantee that the atmosphere will be provided during the drying process, the products will be dried evenly, the appearance of the products will not be spoiled and the drying time will not be extended. The automatic voltage regulation system serves the device for intensive assembly of products during a specified time.

Keywords: drying, hot air, dried product, human health, vitamin, ceramics, quartz tube, infrared radiation, evaporation.

KIRISH

Qishloq xo‘jalik maxsulotlar (paxta) ini qayta ishlash texnologik jarayonlarini maqsadli samaradorlikka ega texnika va texnologiyalarni yaratishga oid keng qamrovli ilmiy-amaliy chora-tadbirlar amalga oshirilmoqda. Qishloq xo‘jalik maxsulotlarinin qayta ishlash korxonalari tomonidan tayyorlab berilayotgan maxsulot xom-ashyosi, ishlab chiqarilayotgan mahsulotlar va ularning sifat va maxsulot saqlashni ta’minlash, xom-ashyo, ishchi kuchi va energiya sarfini kamaytirish yo‘lida xizmat qiladigan texnika va texnologiyalarni qo‘llash muhim ahamiyat kasb etmoqda.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Olib borilayotgan tadqiqotlarda paxta tolasining 96-98 % pishgan sellyulozadan iborat bo‘ladi [1, 2]. Tolaning strukturaviy tuzilishi bo‘yicha g‘ovak-kapillyar materiallar qatoriga kiradi [3]. Adsobrsiyalangan nam miqdor, tabiiy sharoitda muhit holati, tola qobig‘ining yog‘-tukliligi va harorati bilan bevosita bog‘liqdir. Tola o‘zining atrofidagi muhit bilan ta’sirlashuvi, yuzaning katta bo‘lganligi uchun o‘zgarmas termodinamik sharoitda katta tezlikdagi adsorbsiya va desorbsiya bilan boshqa tarkibiy bo‘laklardan ajralib turadi. Shuning uchun namlik toladan tez ajraladi. Buni quritish texnologiyasida alohida e’tiborga olish zarur bo‘ladi. Chigitning po‘stlog‘i g‘ovak-kapillyar material hisoblanib, qalinligi 300 mkm ga yaqin qavatma-qavat joylashgan yagona yog‘ochsimon kletkalardan tuzilgan [4]. Chigitning tarkibi 40÷45 % sellyuloza, 20÷35 % lyagnina, 28÷30 % pentozanov, 2÷3 % protein, 2÷3 %

suv va 5 % atrofida boshqa moddalardan iborat bo‘ladi. Bu moddalar namlik bilan fizik-kimyoviy va fizik-mexanikaviy bog‘lanishga ega bo‘ladi. Mag‘iz esa kolloid material bo‘lib, kimyoviy bog‘langan namlik, fizik-kimyoviy bog‘langan namlik, adsorbsion, osmotik, tarkibiy va ozroq miqdorda mikrokapillyardagi mexanik bog‘langan namlikka ega bo‘ladi.

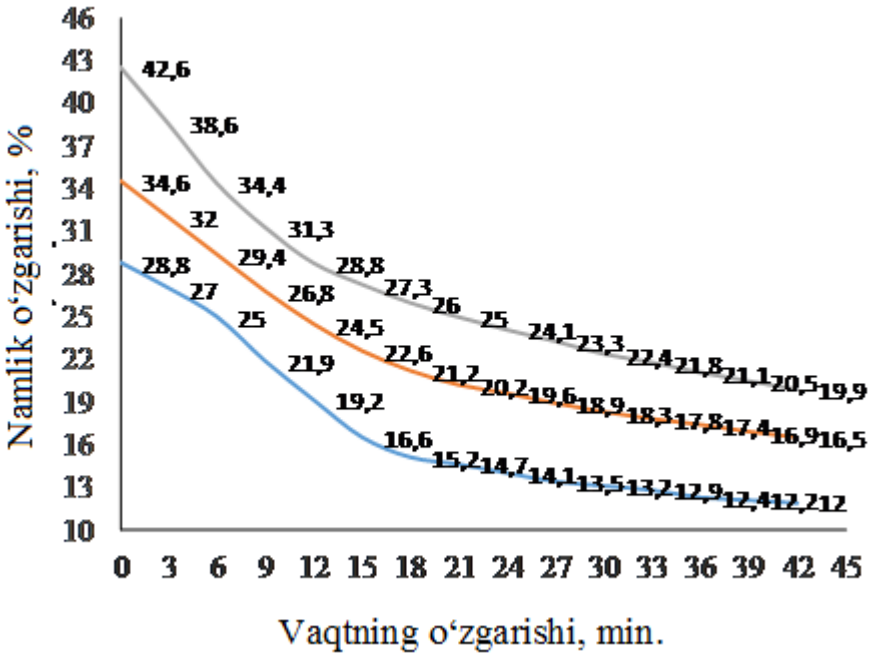
Uzluksiz nurlanish katta zichlikka ega bo‘lgan energiyali impulsga aylanadi. Impulsdagi energiya zichligining yuqoriligi infraqizil nurlanishni mahsulotga chuqurroq kirib borishini ta’minlaydi. Uzoq infraqizil sohasida kvant energiyasining uncha katta bo‘lmaganligi sababli organik tashkil etuvchilarning buzilishi kuzatilmaydi [5, 6].

NATIJA VA MUHOKAMA

Ko‘p funksiyali keramika qoplangan infraqizil quyta ishlash qurilmasida quyidagi tajriba natijalari aniqlandi. Bizga ma’lumki, qishloq ho‘jalik mahsulotlarini quritishda, quritish haroratining meyor talablari asosida 50 ^{0}S dan oshmasligi tadqiqotlar natijasida aniqlangan. Qurilmaning ishchi zonasida uchta yuqoridan pastga qarab 300 mm, 400 mm va 500 mm nuqtalariga “Operation manual for temp.& humidity meter” yordamida bir vaqtning o‘zida harorat va havoning nisbiy namligini ko‘rsatuvchi termoparali datchik yordamida nazoratga olindi. Nazorat natijasida ishchi harorat 50 ^{0}S dan, havoning nisbiy namligi esa 27 % dan ko‘tarilmaganligi aniqlandi.

Namliklari 12.0, 17.0 va 24.0 % bo‘lgan 100 gr og‘irlikdagi paxtaning yuza qismiga 15 gr. suv purkaldi. Natijada paxtaning namliklari mos ravishda 28.9 %, 34.6 % va 42.6 % ga ko‘tarildi. Paxtani quritish jarayonida nurlatgich va paxtaning orasidagi masofani 170 mm qilib olindi. Tajriba o‘tkazish vaqti 3 minutdan 42 minutgacha davom etdi. Tajriba davomida har 3 minutda paxtaning og‘irligini kamayishi “Valor3000Xtreme” rusumli 200 gr. og‘irlikgacha o‘lchovchi elektron tarozida o‘lchab borildi:

28.9 % namlikdagi paxtaning namligi 3 minutdan 42 minutgacha bo‘lgan vaqt oralig‘ida 12.0 % ga, 34.6 % namlikdagi paxtaning namligi 16.5 % ga hamda 42.6 % namlikdagi paxtaning namligi 19.9 % ga kamayganligi aniqlandi (2-rasm) [7, 8].



2-rasm. Paxtaning yuza qismidagi suvga infraqizil nurlanishning ta’siri

200 mm qalinlikdagi paxtaning qurish natijasida: namligi 12.10 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 1.95 % ga, o‘rta qismida 1.41 % ga va quyi qismida 1.66 % ga kamayishi aniqlandi. Namligi 14.70 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 1.72 % ga, o‘rta qismida 0.94 % ga va quyi qismida 1.09 % ga kamayishi aniqlandi. Namligi 18.30 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 2.63 % ga, o‘rta qismida 1.19 % ga va quyi qismida 1.54 % ga kamayishi aniqlandi.

300 mm qalinlikdagi paxtaning qurish natijasida: namligi 12.10 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 1.77 % ga, o‘rta qismida 0.85 % ga va quyi qismida 0.58 % ga kamayishi aniqlandi. Namligi 14.70 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 2.30 % ga, o‘rta qismida 1.36 % ga va quyi qismida 1.47 % ga kamayishi aniqlandi. Namligi 18.30 % bo‘lgan paxtaning namligi 3 minut davomida paxtaning yuqori qismida 1.62 % ga, o‘rta qismida 1.37 % ga va quyi qismida 2.37 % ga kamayishi aniqlandi.

Quritish qurilmasida paxtaning qalinligi 300 mm olinib, uni 3-minut vaqt davomida quritish natijasija qatlamning yuqori, o‘rta va pastki qismlaridagi namlikni kamayishi natijalari va ularning grafik tenglamasi quyidagi jadvalda keltirilgan. Natijada quyidagi ayrim hulosalarga kelishimiz mumkin:

Namlik, % Vaqt, sek;	12.10 %	14.70 %	18.30 %
Paxtaning yuqori qismida			
0	12.10	14.70	18.30
30	11.44	13.55	17.59
60	11.08	13.18	17.37
90	10.87	12.97	17.22
120	10.62	12.76	17.01
150	10.46	12.54	16.83
180	10.33	12.40	16.68
Tenglama	$y=0.00004x^2-0.017x+12.1$	$y=0.00007x^2-0.025x+14.7$	$y=0.00003x^2-0.015x+18.3$
Paxtaning o‘rta qismida			
0	12.10	14.70	18.30
30	11.82	13.91	17.70
60	11.65	13.74	17.51
90	11.52	13.62	17.36
120	11.44	13.53	17.21
150	11.34	13.42	17.06
180	11.25	13.34	16.93
Tenglama	$y=0.00002x^2-0.018x+12.1$	$y=0.00005x^2-0.016x+14.7$	$y=0.00003x^2-0.013x+18.3$
Paxtaning quyi qismida			
0	12.10	14.70	18.30
30	11.97	13.88	17.58
60	11.96	13.67	17.10
90	11.82	13.58	16.79
120	11.72	13.44	16.46
150	11.62	13.36	16.17
180	11.52	13.23	15.93
Tenglama	$y=-0.0000012x^2-0.003x+12.1$	$y=0.000047x^2-0.016+14.7$	$y=0.00004x^2-0.02x+18.3$

XULOSA

1. Ko‘p funksiyali keramika qoplangan infraqizil quritish qurilmasida olib borilgan tadqiqot natijasida:

-tavsiya qilingan qurilmada infraqizil quritgichning temperaturasi deyarli 50 ^{0}S ekanligi maqsadga muvofiqdir.

-paxtani quritishda nurlatgich va paxta orasidagi masofaning optimal qiymati 300 mm ekanligi asoslandi.

-qurish jarayonida ishchi harorat belgilangan talablar asosida ekanligi, paxtani mexanik shikastlanmaganligi, ortiqcha

namlik bug‘lanayotganligini inobatga olib, tolaning sifat ko‘rsatkichlariga ziyon yetmasligini hulosa qilish mumkin.

-infraqizil nurlanish tabiatiga muvofiq nurlangan mahsulot tarkibidagi zamburug‘larni fiziologik faoliyatini to‘xtatishga xizmat qilishi, quritilgan paxtaning sterillanishi.

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O‘QUVCHILARNING KOGNITIV QOBILIYATLARINI RIVOJLANTIRISHDA TILNING GRAMMATIK VA SINTAKTIK XUSUSIYATLARI

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ANNOTASIYA

Mazkur maqolada o‘quvchilarning kognitiv qobiliyatlarini rivojlantirishda tilning grammatik va sintaktik xususiyatlarining ahamiyati tahlil qilinadi. Tilning grammatik va sintaktik tuzilmalari o‘quvchilarda mulohaza qilish, mantiqiy bog‘liqliklarni tushunish va tahlil qilish qobiliyatlarini rivojlantirishda muhim o‘rin tutadi. Maqolada sintaks va grammatika qoidalarining kognitiv jarayonlarga ta'siri hamda pedagogik yondashuvlar muhokama qilinadi. Shuningdek, o‘quv jarayonida interaktiv usullar va ta'lim texnologiyalarining o‘rni alohida qayd etiladi.

Kalit so‘zlar: kognitiv qobiliyatlar, grammatika, sintaks, mulohaza qilish, mantiqiy bog‘liqliklar, pedagogik yondashuvlar, ta'lim texnologiyalari.

ABSTRACT

This article analyzes the importance of grammatical and syntactic features of the language in the development of students' cognitive abilities. Grammatical and syntactic structures of the language play an important role in the development of students' ability to reason, understand and analyze logical connections. The article discusses the impact of syntax and grammar rules on cognitive processes and pedagogical approaches. Also, the role of interactive methods and educational technologies in the educational process is specially noted.

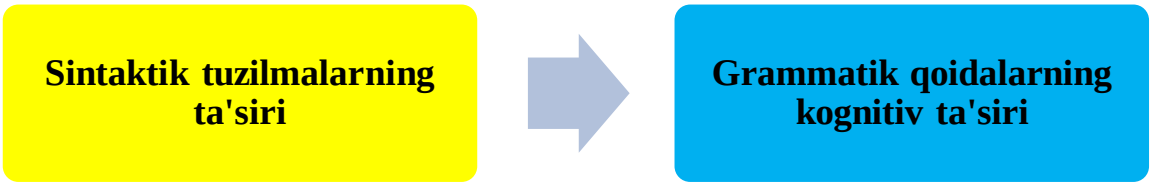
Keywords: cognitive skills, grammar, syntax, reasoning, logical connections, pedagogical approaches, educational technologies.

KIRISH

Bugungi ta'lim tizimida o‘quvchilarning kognitiv qobiliyatlarini rivojlantirishga katta ahamiyat berilmoqda. Kognitiv qobiliyatlar — insonning bilish va fikrlash qobiliyatlari bo‘lib, ular o‘quv jarayonida muhim o‘rin tutadi. Ushbu qobiliyatlarni rivojlantirishda tilning grammatik va sintaktik xususiyatlari, ya'ni til qoidalarini qo‘llash va tushunish muhim ahamiyat kasb etadi. Tilning turli qoidalari orqali o‘quvchilarning mulohaza qilish, tahlil qilish, bog‘liqliklarni tushunish qobiliyati rivojlanadi.

Kognitiv kompetentsiyalarni shakllantirishning metodik ta'minoti, zamonaviy texnologiya bosqichlarida virtual laboratoriyalar, o'quv videomuloqot – videokonferentsiyalarni tashkil etish o'qituvchilarning axborot madaniyatini rivojlantirish, o'quvchilarning ta'limiydasturiy vositalar bilan ishlash layoqatini shakllantirish imkoniyatini yaratadi [1, 277].

Grammatik va sintaktik tuzilmalarning kognitiv rivojlanishga ta'siri:



Tilning grammatik va sintaktik tuzilmalari kognitiv qobiliyatlarni rivojlantirishda muhim omil bo‘lib xizmat qiladi. Bunda quyidagi jihatlar muhim ahamiyatga ega:

1. **Sintaktik tuzilmalarning ta'siri.** Sintaks — bu jumla tuzish qoidalari va unga amal qilish jarayonidir. Uzun va murakkab tuzilmali jumla tuzishga urinish o‘quvchidan fikrlash qobiliyatini talab qiladi. Masalan, murrakab jumla tuzilishi va uni tushunish kognitiv jarayonlarni kuchaytiradi, chunki o‘quvchi jumla qismlari o‘rtasidagi mantiqiy bog‘liqlikni tushunishi kerak bo‘ladi. Sintaktik tuzilmalarning o‘quvchilarning fikrlash va tushunish qobiliyatlariga ijobiy ta’siri bor. Murakkab va uzun jumlalar o‘quvchilarning fikr yurg‘izish jarayonini rivojlantirib, ularning kognitiv malakalarini mustahkamlaydi. Ta’lim jarayonida sintaksning bu xususiyatlaridan samarali foydalanish o‘quvchilarga nafaqat til qoidalarini o‘zlashtirish, balki mustaqil fikr yuritish va mantiqiy bog‘liqlarni chuqur tushunish imkonini beradi.

Murakkab va uzun jumlalarni tuzishga urinish o‘quvchining mulohaza qilish qobiliyatini faollashtiradi. Bu kabi jumlalar mazmunini tushunish o‘quvchidan jumla qismlari orasidagi mantiqiy bog‘liqlikni anglashni talab qiladi. Misol uchun, jumladagi bo‘laklarning bir-biri bilan aloqasini tushunish orqali o‘quvchi ma’noni to‘g‘ri anglaydi. Bu jarayon o‘quvchilarning sinchkovlik bilan fikrlash, tahlil qilish va ma’lumotlarni boshqarish qobiliyatini kuchaytiradi.

2. **Grammatik qoidalarning kognitiv ta'siri.** Grammatika qoidalari, jumladan, zamonlar, bosh va yordamchi fe'llar, hollar o‘rtasidagi bog‘liqliklarni tushunish o‘quvchilarda ma'lumotni mantiqiy tarzda ishlashga yordam beradi. Grammatika bilimlari orqali o‘quvchilar turli kontekstlarda so‘z va jumla tuzilishini o‘zgartirishni tushunishga erishadilar, bu esa ularning kognitiv qobiliyatlarini kuchaytiradi. Zamonlar, bosh va yordamchi fe’llar kabi grammatika qoidalarining o‘rganilishi orqali o‘quvchilar mantiqiy bog‘liqliklarni chuqur tushunishga erishadilar. Masalan, zamonlar

orasidagi farqlarni anglash o‘quvchiga jumlada sodir bo‘layotgan harakatning vaqtini aniqlash imkonini beradi. Bu esa ularning o‘qiyotgan matn yoki gapni to‘g‘ri anglashiga, har bir so‘z va fe’lning vaqt doirasini aniqlashga yordam beradi. Jumladagi bosh va yordamchi fe’llarning birgalikdagi o‘rni esa o‘quvchiga harakatning shakl va mazmunini anglash imkonini beradi, bu esa ma’lumotlarni tizimli ravishda tushunishga yordam beradi.

Kognitiv qobiliyatlarni rivojlantirishda tilning roli

Til o‘rganish jarayonida o‘quvchilar fikrlash, mantiqiy bog‘liqliklarni tushunish va tizimlashtirish kabi qobiliyatlarni rivojlantiradilar. Bunda grammatik va sintaktik tuzilmalarni chuqur o‘rganish quyidagi jihatlarda ahamiyatlidir:

1. **Mulohaza qilish va tahlil qilish qobiliyati.** Grammatik va sintaktik tuzilmalarni qo‘llash orqali o‘quvchilar jumla tuzish va undagi bog‘liqliklarni tushunishga o‘rganadilar. Bu, o‘z navbatida, mulohaza qilish qobiliyatini rivojlantirishga yordam beradi.

2. **Kognitiv muammolarni yechish qobiliyati.** Muammoli vaziyatlarda grammatik qoidalarni qo‘llash va sintaktik tuzilmalarni tushunish orqali o‘quvchilar muammolarni yechishga yordam beruvchi fikrlash tizimini rivojlantiradilar. Bu jarayon ularning tanqidiy fikrlash qobiliyatini ham oshiradi.

Ma'lumotni qayta ishlash va xotirani rivojlantirish

Grammatik tuzilmalarni yodlab olish orqali o‘quvchilar xotiralarini rivojlantiradilar. Bu jarayon ma'lumotni mantiqiy bog‘lash va tizimlashtirishga yordam beradi, bu esa kognitiv qobiliyatlarni yanada mustahkamlaydi.

Pedagogik yondashuvlar

O‘quvchilarning kognitiv qobiliyatlarini rivojlantirishda grammatik va sintaktik qoidalarni amaliyotga tatbiq etish muhimdir. Pedagoglar ushbu jarayonda quyidagi yondashuvlardan foydalanishlari mumkin:

- **Mashqlar va o‘yinlar**: Grammatik va sintaktik tuzilmalarga asoslangan mashqlar, masalan, tushuntirish, tajriba orqali o‘rganish, interaktiv o‘yinlar kognitiv qobiliyatlarni rivojlantiradi.
- **Hamkorlikda o‘rganish:** Guruh bo‘lib amalga oshiriladigan mashqlar, baho berish jarayonida mulohaza qilish va ma'lumotni qayta ishlash qobiliyatini rivojlantiradi.

XULOSA

Tilning grammatik va sintaktik xususiyatlarini chuqurroq o‘rganish o‘quvchilarning kognitiv qobiliyatlarini rivojlantirishga sezilarli darajada yordam beradi. Grammatik va sintaktik qoidalarni to‘g‘ri tushunish orqali o‘quvchilar nafaqat tilda, balki hayotiy

jarayonlarda ham muammolarni mantiqiy yechish va ma'lumotni to‘g‘ri qayta ishlash kabi ko‘nikmalarni rivojlantiradilar. Bunda pedagogik yondashuvlarning to‘g‘ri tanlanganligi muhim bo‘lib, ushbu jarayonda interaktiv usullardan foydalanish o‘quv jarayoni samaradorligini oshiradi.

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TRANSLATION OF TEXTS RELATED TO POPULAR SCIENTIFIC LITERATURE: LINGUISTIC ASPECTS

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ABSTRACT

This article examines the linguistic aspects of translating texts related to popular scientific literature. It highlights the importance of understanding linguistic features, such as terminology, syntax, and stylistic elements, to achieve effective translations. Through a comparative analysis of original texts and their translations, the study identifies common challenges and offers strategies for overcoming them, ultimately contributing to better communication of scientific knowledge to a wider audience.

Keywords: Popular scientific literature, Linguistic aspects, Terminology, Syntax, Stylistic elements, Comparative analysis, Communication, Scientific knowledge, Cross-cultural dissemination

Introduction

Popular scientific literature serves as a bridge between complex scientific concepts and the general public. The role of translation in this context is crucial, as it facilitates the dissemination of knowledge across linguistic and cultural boundaries. However, translating popular scientific texts presents unique challenges, particularly concerning linguistic aspects. The intricacies of terminology, the structure of sentences, and the stylistic choices made by authors all influence how effectively the information is communicated. This article aims to explore these linguistic aspects, highlighting their significance in the translation process. The translation process is a creative activity. For inexperienced professionals, it can cause difficulties, since there are original approaches, i.e. going beyond certain limits, leading to the loss of the translation status. In ambiguous cases, translation techniques allow one to act within the framework of the relevant rules. At the same time, a single model (approach) can't reflect all aspects of the phenomenon under study in all its complex interconnections and relationships. Each model carries out the modeled process in a different way; they are not mutually exclusive. On the contrary, there is a lot of overlap, models partially intertwine and only in their totality give an idea of the translation process in all its complexity and diversity [4,514].

Methods

The study employs a qualitative approach, analyzing a selection of popular scientific texts and their translations in various languages. The texts were chosen based on their accessibility and popularity among readers. A comparative analysis was conducted, focusing on key linguistic features, including:

1. Terminology: The use of specialized vocabulary and its adaptation for the target audience.

2. Syntax: The structure of sentences and the complexity of grammatical forms.

3. Stylistic Elements: The author's tone, style, and figurative language.

The analysis involved identifying discrepancies between the original texts and their translations, examining how these discrepancies impact the overall understanding of the scientific content.

Results

The findings reveal several key challenges and considerations in the translation of popular scientific literature:

1. Terminology: One of the primary challenges is the accurate translation of scientific terms. Many specialized terms may not have direct equivalents in the target language, necessitating the use of explanations or adaptations. This can lead to misunderstandings or oversimplifications of complex concepts.

2. Syntax: The structure of sentences in popular scientific literature often varies significantly across languages. For instance, English may favor longer, more complex sentences, while other languages may prefer shorter, more direct constructions. Translators must navigate these differences to maintain clarity and coherence in the translated text.

The syntax of a text significantly influences how information is conveyed and understood. Popular scientific literature often employs a variety of sentence structures, ranging from simple to complex, which can pose challenges during translation.

For example, English often uses longer, more elaborate sentences with multiple clauses to express intricate ideas. In contrast, other languages may favor shorter, more straightforward sentence constructions. Translators must navigate these differences to ensure that the translated text retains clarity and coherence.

Moreover, the complexity of grammatical forms, such as the use of passive voice or conditional statements, can also vary across languages. A direct translation might result in awkward phrasing or a loss of meaning. Therefore, the translator must adapt the syntax to suit

the grammatical conventions of the target language while preserving the original intent of the author.

Stylistic Elements: The tone and style of the original text are essential for engaging the reader. Translators must balance fidelity to the source text with the need to create an appealing and accessible translation. This often involves making stylistic adjustments while ensuring that the scientific integrity of the content is preserved. The stylistic elements of a text, including the author's tone and use of figurative language, play a crucial role in engaging the reader. In popular scientific literature, the author's style is often more conversational and accessible than in traditional scientific writing, making it essential for translators to capture this tone in their translations.

Translators must also consider the use of metaphors, similes, and other figurative language. These elements enhance the readability of the text but can be particularly challenging to translate. A metaphor that works well in one language may not have the same impact in another. Therefore, translators must find equivalent expressions that convey the same meaning and emotional resonance without losing the author's original intent.

Maintaining the author's tone and style is vital for ensuring that the translation feels authentic and engaging to the target audience. This often requires a delicate balance between fidelity to the source text and the need to create a translation that resonates with readers.

Discussion

The translation of popular scientific literature requires a nuanced understanding of linguistic aspects that go beyond mere word-for-word translation. Translators must possess not only linguistic proficiency but also a deep familiarity with the subject matter. This dual expertise enables them to convey complex scientific ideas effectively while considering the target audience's needs and expectations.

Furthermore, collaboration between scientists, authors, and translators can enhance the translation process. By involving subject matter experts, translators can ensure that the translated texts accurately reflect the scientific content, fostering better communication and understanding among readers.

In analyzing the translation process, it is crucial to identify discrepancies between original texts and their translations. These discrepancies can arise from challenges in terminology, syntax, and stylistic choices. For instance, a translation that simplifies scientific terms may make the content more accessible but could also lead to misunderstandings or oversimplifications of complex ideas.

Examining these discrepancies provides valuable insights into how they impact the overall understanding of scientific content. A translation that fails to adequately convey the nuances of the original text may hinder readers' comprehension and appreciation of the subject matter. Conversely, a well-executed translation can enhance understanding and engagement, fostering a deeper connection between the reader and the scientific concepts presented.

Conclusion

Translating texts related to popular scientific literature presents unique linguistic challenges that necessitate careful consideration of terminology, syntax, and stylistic elements. By recognizing and addressing these aspects, translators can enhance the accessibility and clarity of scientific knowledge for diverse audiences. The collaborative approach involving scientists and translators can further improve the quality of translations, ultimately promoting a more informed public discourse on scientific issues.

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ENERGETICALLY INVESTIGATING AND BIOLOGICAL EFFECTS OF ALPHA RAYS IN HUMAN BODY

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ABSTRACT

This study examines the impact of ionizing radiation, particularly alpha particles, on human cells and molecules, with a focus on DNA damage. Alpha particles, although unable to penetrate the skin, pose significant health risks when inhaled, swallowed, or entered the body through a cut, causing severe damage to sensitive living tissue. The experiment involved measuring alpha particle interactions with human cells, revealing that even low doses of radiation can cause significant biological changes, including mutations that may lead to cancer in the current or future generations. According to the comparison of the energy of radio-active radiation, alpha rays cannot pass through ordinary paper. Accordingly, in our experimental procedure and method, we first record alpha particles without radio-active nucleus, and then we use radio-active nucleus that emit alpha rays. has taken into consideration. According to the relevant data, we have drawn graphs and obtained alpha ray energy in air $E_{\propto max} = 3.407\ Mev$ and distance $R_0 = 1{,}99mm$.The results indicated that alpha particles induce DNA double-strand breaks (DSBs) in the nuclei of peripheral blood mononuclear cells (PBMCs), underscoring the necessity for stringent radiation protection measures. This study highlights the critical need for understanding radiation-induced damage mechanisms to develop effective prevention and treatment strategies for radiation-related health issues.

Keywords: Alpha Particles, Radiation Effects, dose energy of radiation, biological effects; determination of length path and energy of α particles.

Introduction

The emission of ionizing radiation from any source such as X-rays, radioactive nucleus, Antiproton beam, Neutron(n) and Meson ($\pi^{\pm}$), causes ionization and excitation of electrons in the atom, resulting in the transfer of energy to tissues Fig. 1. The given energy can easily cause the molecule to change. As a result, the change of molecules in the body becomes the cause of dangerous events. The human body has a very closed and complex structure including many organs, each of which is made up of one or more closed tissues. There are many elements in the same tissues and cells, and these elements include, for

example, oxygen, hydrogen, sulfur, phosphorus, carbon, and water, and radiation has a specific effect on each element [1].

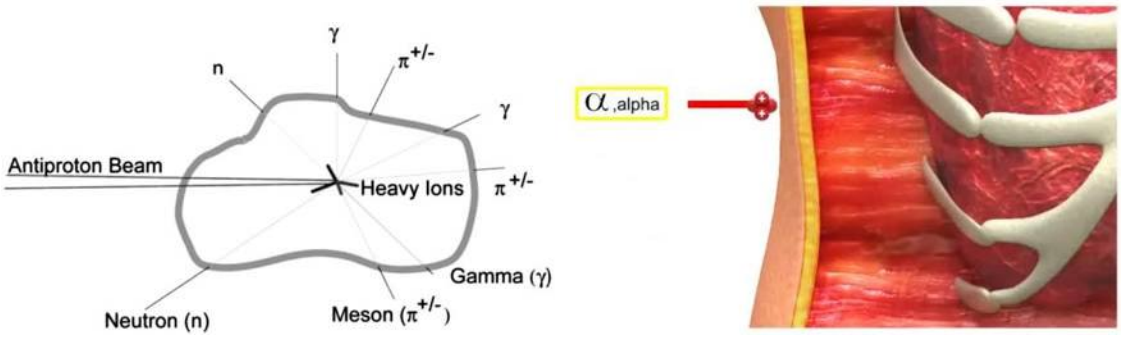


Fig. 1. Interaction Antiproton and Alpha ray with human body.

The relationship indicates that if the dose level of radiation energy increases, then as a result, the biological, clinical, and physical effects of radiation in the whole body or each part of the body are caused in two ways [2].

1. Random effects: For example, there is a possibility that a very low energy dose with a value of zero to two hundred millisieverts $(0-200msv)$ can cause a biological and pathological change in the tissues in the future and bring up the following effects.

- At a very low energy dose, 0-200msv, that is, in the limit of $0\ to\ 200$ millisieverts, there is a high probability of this radiation damage.
- There is no specific limit (attack) for radiation energy dose, but it can induce mutations in DNA. Because of this, defective cells of the body or defective cells of the gene are formed, as a result, cancer can occur in the current generation or the next generation.
- The damage occurs suddenly and therefore cannot be predicted.
- The degree of damage is not subject to the radiation energy dose, but the probability and frequency of occurrence are directly related to the energy dose.
- The last stochastic loss of body cells is blood cancer (Leukemia), which has a high rate of occurrence after eight years, and other cancers such as lung, thyroid, and breast cancer, etc., which have a high rate of occurrence. It occurs after about 20 to 30 years.
- The final harm of genetic stochasticity, which results from mutation, is hereditary disease such as the birth of disabled children (Malformatiol) or other diseases [2,3].

2. Non-random or deterministic effects: The non-random or deterministic effects of radiation is not a statistical phenomenon, it can occur when the energy dose exceeds a certain limit, then after this stage as a result of the pathological effects, the severity of the disease increases according to the energy dose, for example, for the skin, this level has been revealed at a little six grams $(6Gy)$. An example of this effect is:

- Erythem
- Cataract

If an energy dose of less than six grams $(6Gy)$ reaches the skin of $10cm^2$of the body at one time, no clinical adverse effect appears, but when the energy dose level is equal to or higher than six grams, the skin color first appears. In this stage, it becomes red (Erythem) and if it exceeds this value, then the skin burns and causes the skin to die or necrosis (Necrosis) [3].

Effects of radiation on body molecules

The human body is made up of molecules and atoms, these molecules and atoms interact with radiation and the atomic composition of the body determines the degree of interaction. Proteins, fats, sugars, and nucleic acids are very large molecules, some of which are composed of hundreds of atoms. One of these molecules inside the nucleus is DNA, which is the most basic molecule and the most critical molecule due to the effects of radiation Fig. 2. Another molecule that is most included in the vital substance is nucleic acid with metabolic value, DNA, RNA. RNA is mainly divided into two types, mRNA and tRNA, in the cytoplasm of the cell, each of which has different biochemical characteristics and different roles. The diagram below shows the structure of DNA, RNA, and the expression of its components.

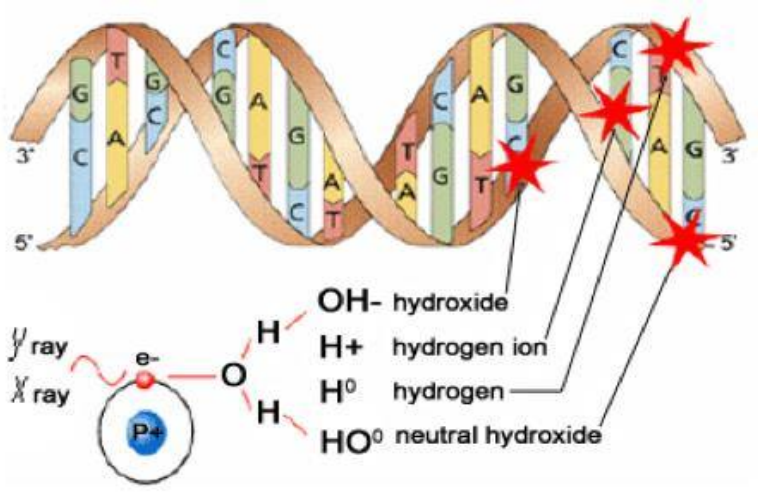


Fig. 2. Interaction of molecules inside the nucleus is DNA.

DNA is made up of different types of sugars and phosphates, and each sugar molecule has one of four nitrogen-containing special bases, which are adenine, guanine, thymine, and cytosine. On the type of spring, it is complicated as in the above form. It should be noted that when biological macromolecules come under radiation bombardment in an external living environment, approximately $10kGY$ radiation can cause physical changes in it, while these molecules are alive. A cell bombarded with only about $50\ mGy$ of radiation can produce measurable biological reactions. The nucleus is more sensitive than the cytoplasm. A dose of $1Gy$ radiation is required to kill the nucleus of a cell. Meanwhile, $10GY$ radiation can do the same thing on the cytoplasm [4].

Effects of radiation on cells

In females, the sex cells include the Oogonium. In males is Spermatogonium. The remaining cells of the human body are somatic. Body cells range from $3\ to\ 100$ microns in diameter and each cell are made up of approximately 10^{14}atoms. At the time of birth, the body cells are approximately 3.10^{12}, so when it reaches adulthood, the number of cells in all tissues reaches 4.10^{3}. It creates members and then members create the system. Such as the nervous system, digestive system, endocrine system, reproductive system, and so on.

All organs of the body have different sensitivities to radiation. These sensitivities are related to the function and growth of organs, and exposure to cells and organs is also related to personal sensitivity. In 1906, two French scientists named Bergonie and Tribondeau explained that the sensitivity of visible tissues to radiation is

subject to metabolic activity and consequently described the sensitivity of living tissue to radiation as follows [1].

- The immature cell is more sensitive to radiation than the mature cell.
- Young tissues and organs are very sensitive to radiation.
- The higher the metabolic rate, the higher the sensitivity.
- The more the amount of cell reproduction and tissue growth increases, the more sensitive it is to radiation.

The adverse biological effects of radiation on a cell are as follows

- Chromosomal aberration.
- Induction of cancer.
- Induction of somatic mutation in body cells.
- Birth of disabled children.
- Induction of cell killing.
- Weakening of the body's immune system.
- Sudden impacts occur below about 250 milliseconds $< 250msv$.
- Non-accidental effects such as radiation sickness are most likely to occur when the radiation level exceeds 250 millisieverts $> 250msv$ [1-3].

DNA (Deoxyribonucleic acid) and radiation response

There are forty-six chromosomes in every single cell of the human body, in which all the genetic material and hereditary information are safely stored. One of the most important parts of chromosomes is the Deoxy ribonucleic acid molecule. Deoxy rib nucleotide is made up of a double helix. It consists of nitrogen (base), sugar or sugar, and phosphate group from Uracil (U=Uracil). The bases of DNA molecules such as adenine, guanine, cytosine, thymine, and uracil are connected with the help of hydrogen bonds. Human DNA is two meters long and two nanometers (one billionth of a meter) wide. In 2001, the human genetic code was published and it was revealed that there are about 30,000 30,000 embryos. The response of ionizing radiation to the cells of the body is very bad when it hits the DNA of the chromosomes because all the genetic information of a cell's life is kept safe in the DNA molecule Fig. 3.

- The breaking number of a twisted wire of this NA is proportional to the square of the radiation dose.
- The number of breaks in both DNA strands is directly proportional to the radiation dose.
- The chemical bonds that bind the strands of each protein and DNA molecule to each other are destroyed.

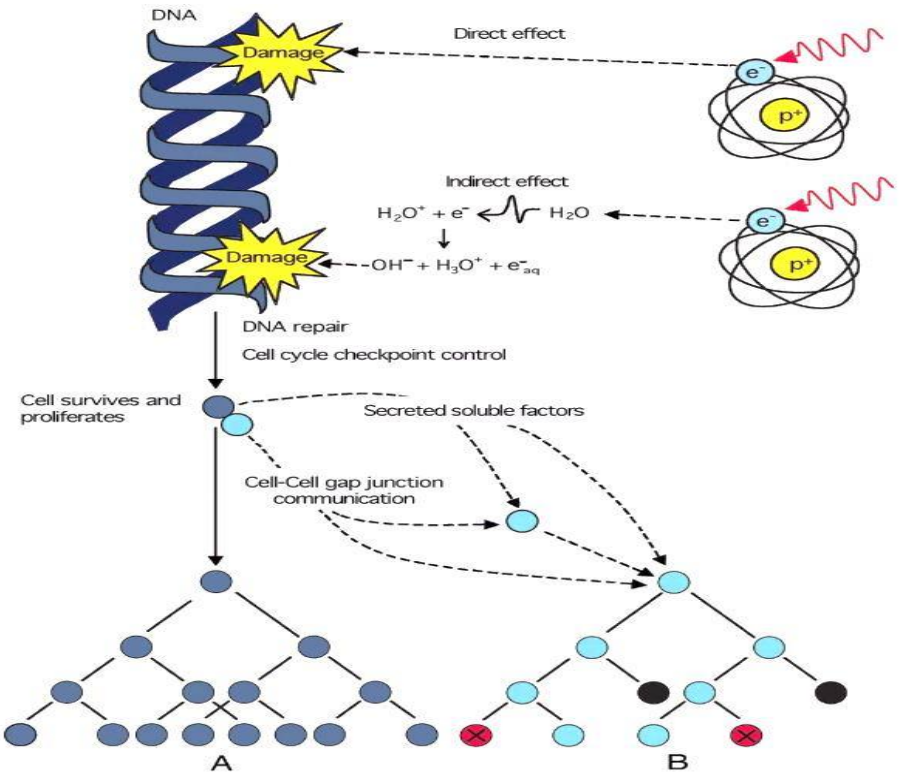


Fig. 3. Direct and indirect effect with DNA.

Today, scientists at the international level have presented two types of models that indicate the harmful effects of ionizing radiation on DNA [5].

The first model: when an ionizing particle hits DNA, it loses some of its energy during the passage, which causes the DNA to cut both strands at once. strand breaks DOUBLE) In this model, the DNA number (N) of the broken DNA is directly proportional to the radiation energy dose D.

The second model: When two ionizing particles that have nothing to do with each other and specifically hit the DNA, each of them can transfer enough energy to the helix, resulting in this model, the DNA number N of the DNA of the tumor is directly proportional to the square D of the radiation energy dose. The average number of DNA fragments N in a cell, which occurs as a result of the radiation energy dose D response, can be obtained from the following equation. Radiation is related to the chemical radicals in the environment of the cell and the way the absorbed energy is dissipated there. Tests have shown that if the ionizing radiation hits the DAN molecule of the healthy cells of the body and cuts the double helix, it can most likely lead to the emergence of cancer cells Fig. 4 [1].

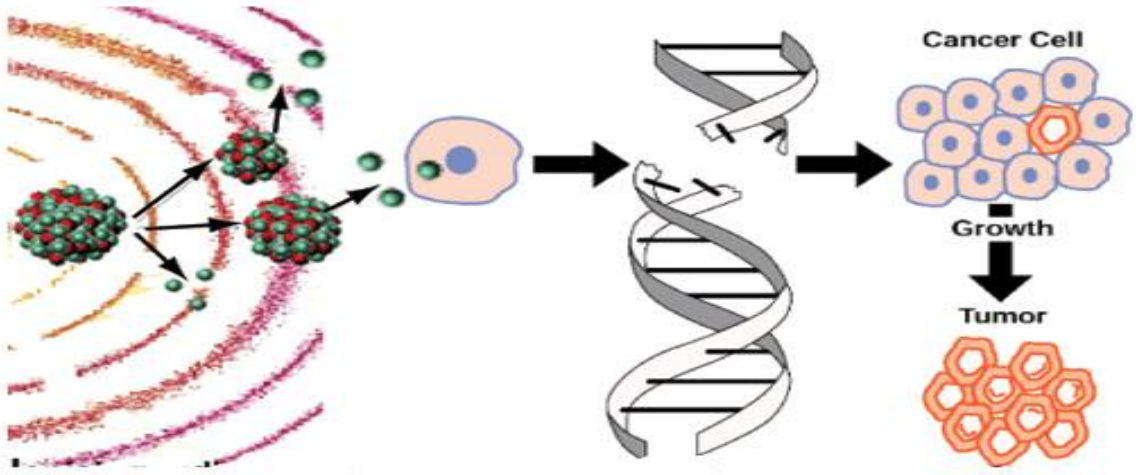


Fig. 4. Increases cancer cells during interaction Alpha ray with DNA.

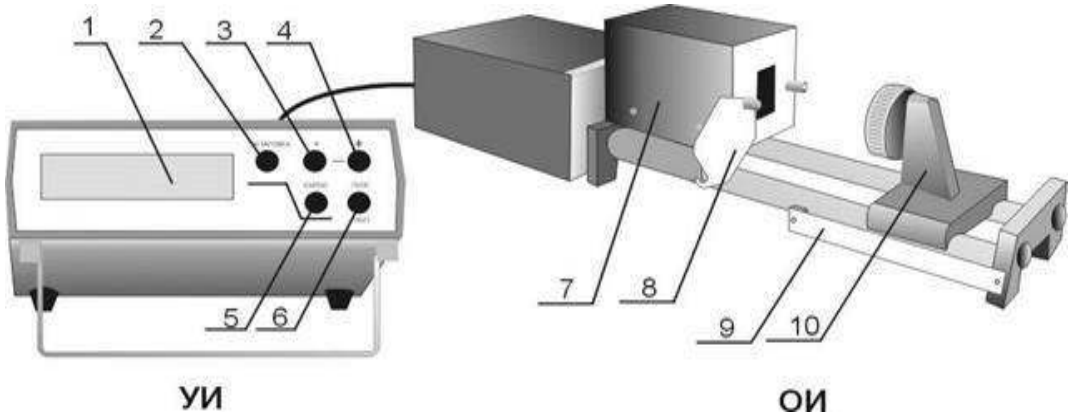
Experiment

To obtain the total number of particles, it is necessary to divide the registered number of particles by the correction, let's take this from Table 1.

$x/r0$	0.1	0.2	0.4	0.5	0.6	0.8	1.0	1.25	1.5
Correction	0,286	0,253	0,197	0,175	0,158	0,127	0,102	0,080	0,062

Table.1

Where x is the distance between the detector window and α −preparation, r_0 is the radius of the detector window [5]. Experimental was carried out on the installation, a schematic view is shown in $Fig.5$.



$Fig.5$. Schematic diagram of the installation. 1- Indicator, 2- Button "Setting", 3 and 4- buttons (+, -), 5-reset, 6-start and stop, 7- Counter block, 8- Curtain, 9-line with a scale, 10-source Alpha particle [3].

To determine the path length of Alpha particles, we obtained the average Background ($\overline{N}$), with a time sweep of $t = 300\ Sec.$

$$\overline{N} = \frac{57+57+65}{3} = 66$$

Here, each time we increase the distance between the source and the detector by $1mm$, remember that here the distance between the source and the detector is $1mm$, and the distance inside the detector itself is $5mm$, $Fig.5$, it turns out to be $7mm$. with a time-base $t = 1\,mim, 2min, 3min$ etc. we multiply the distances by 5, $^5/_2$, $^5/_3$etc. We got a $table.2$.

Time(t)	Distance (x)	Number of particles (N)	Particles – average Background x Time	Result
60Sec	7+0=7 mm	2376	2376-66x5=11550	11550
60 Sec	7+1=8mm	2081	2081-66x5=10075	10075
60 Sec	7+2 =9mm	1710	1710-66x5=8220	8220
60 Sec	7+3 =10mm	1229	1229-66x5=5815	5815
60 Sec	7+4=11mm	762	762-66x5=3480	3480
120 Sec	7+4=11mm	1644	1644-66x2,5=3945	3945
120 Sec	7+5=12 mm	1028	1028-66x2,5= 2405	2405
120 Sec	7+6=13 mm	637	637-66x2,5=1427,5	1427,5
180 Sec	7+6=13 mm	942	942-66x1,666=1459	1459
240 Sec	7+6=13 mm	1298	1298-66x1,25=1540	1540
240 Sec	7+7=14 mm	947	947-66x1,25=1101	1101
300 Sec	7+7=14 mm	1206	1206-66x1=1140	1140
300 Sec	7+8=15 mm	721	721-66x1=655	655
300 Sec	7+9=16 mm	452	452-66x1=386	386
300 Sec	7+10=17 mm	280	280-66x1=214	214
300 Sec	11mm+7mm=18mm	185	185-66x1=185-66	119
300 Sec	12mm+7mm=19mm	146	146-66x1=146-66	80
300 Sec	13mm+7mm=20mm	93	93-66x1=93-66	27
300 Sec	14mm+7mm=21mm	85	85-66x1=85-66	19
300 Sec	15mm+7mm=22mm	98	98-66x1=98-66	32
300 Sec	16mm+7mm=23mm	82	82-66x1=82-66	16
300 Sec	17mm+7mm=24mm	79	79-66x1=79-66	13
300 Sec	18mm+7mm=25mm	85	85-66x1=85-66	19

Table.2

We need to get the real particle number and we need to get r_0 and the correction from the equation.

$$r_0 = \sqrt{\frac{S}{\pi}} = \sqrt{\frac{a.b}{\pi}} = \sqrt{\frac{30mm.18mm}{3,14}} = 13,11mm = 1,311cm$$

$$\text{Correction } (y) = 0.1002(x/r_0)^2 - 0.3139(x/r_0) + 0.3116$$

x/r_0	Correction (**y**)	**Number of particles** (**N**) ÷ Correction (**y**)	Result
7÷ **13, 11** ≅0,533	0,173	11550÷ 0,173	66763
8÷ **13, 11** ≅0,610	0,158	10075÷ 0,158	63765
9÷ **13, 11** ≅0,686	0,144	8220÷ 0,144	57083
10÷ **13, 11** ≅0,763	0,131	5815÷ 0,131	44389
11÷ **13, 11** ≅0,839	0,120	3480÷ 0,120	29000
11÷ **13, 11** ≅0,839	0,120	3945÷ 0,120	32875

12÷ **13, 11** ≅0,915	0,083	2405÷ 0,083	28975
13÷ **13, 11** ≅0,991	0,100	1427,5÷ 0,100	14275
13÷ **13, 11 ≅ 0, 991**	0,100	1459÷ 0,100	14590
13÷ **13, 11** ≅0,991	0,100	1540÷ 0,100	15400
14÷ **13, 11** ≅1,0678	0,093	1101÷ 0,093	11838
14÷ **13, 11** ≅1,0678	0,093	1140÷ 0,093	12258
15÷ **13, 11** ≅1,144	0,086	655÷ 0,086	7616
16÷ **13, 11** ≅1,220	0,080	386÷ 0,080	4825
17÷ **13, 11** ≅1,296	0,076	214÷ 0,076	2815
18÷ **13, 11** ≅1,372	0,0729	119÷ 0,0729	1632
19÷ **13, 11** ≅1,449	0,055	80÷ 0,055	1454
20 ÷ **13, 11** ≅1,525	0,069	27÷ 0,069	391
21÷ **13, 11 ≅ 1, 601**	0,070	19÷ 0,070	27
22÷ **13, 11** ≅1,678	0,071	32÷ 0,071	450
23÷ **13, 11** ≅1,754	0,073	16÷ 0,073	219
24÷ **13, 11** ≅1,830	0,077	13÷ 0,077	168
25÷ **13, 11** ≅1,906	0,082	19÷ 0,082	231

Table.3

Results

To correct, the error of which is received by the detector, we use the correction in Table 1. In this experiment, the results were obtained in Table 3, and from this, the results plotted the correction in Fig. 6.

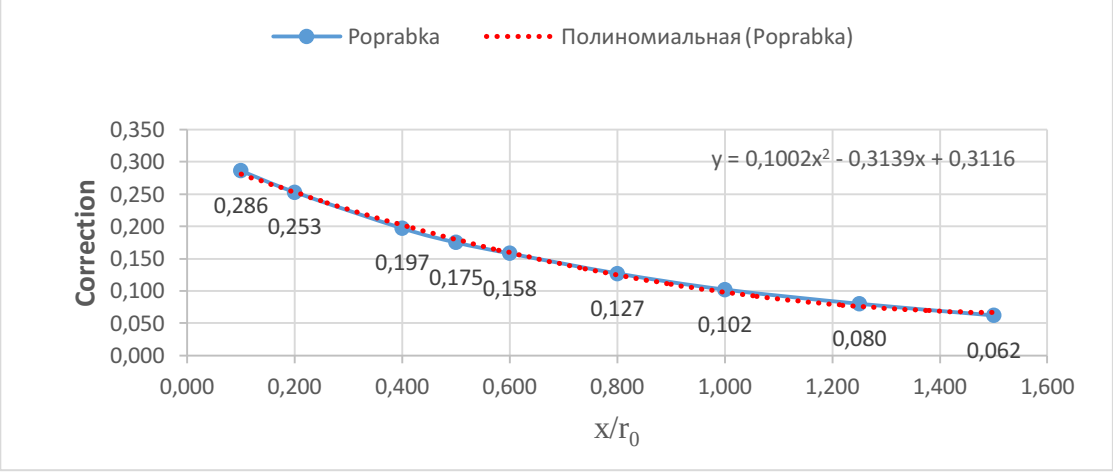


Fig. 6 Correction

Now the number of received particles for correction and built the following graph Fig. 7. d. There is no correction in this chart either. With corrected values, it is necessary to obtain $dN/dx$to the transmission curve of α - particles in Fig.7. e.

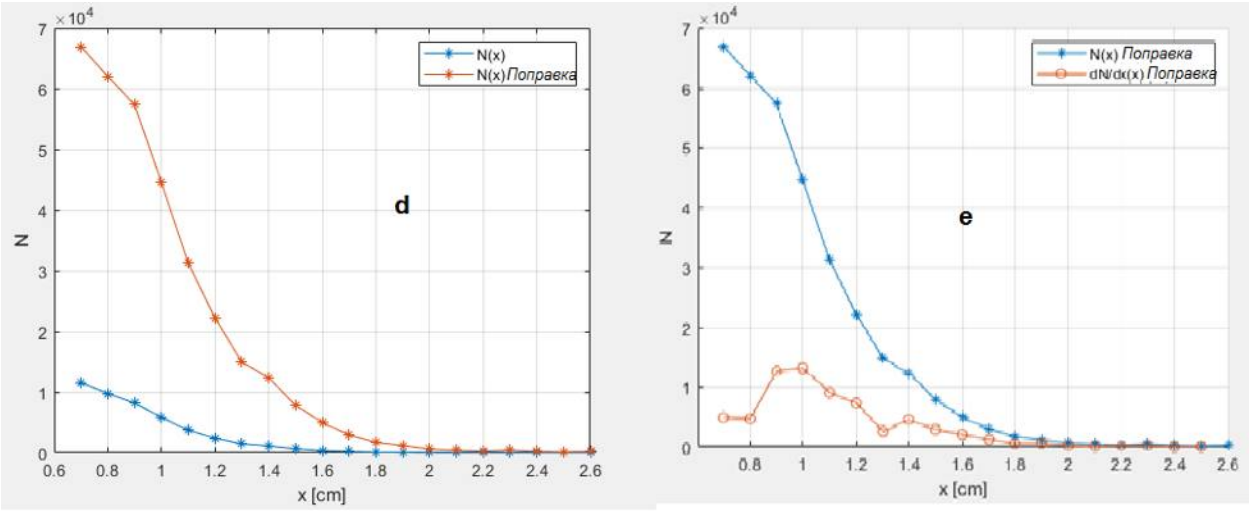


Fig.7. d) Graph of the number of particles received with correction, e) Graph of the passage of Alpha particles through the air without correction.

The values for obtaining energy are maximum at $x = 2$ and minimum at $x = 1$ are shown in Fig.7.e and we obtain the energy of alpha particles from these equations.

$$E_{\propto min} = \left(\frac{R_{min}}{0.318}\right)^{2/3} = \left(\frac{1}{0.318}\right)^{2/3} = 2.146\ Mev$$

$$E_{\propto max} = \left(\frac{R_{max}}{0.318}\right)^{2/3} = \left(\frac{2}{0.318}\right)^{2/3} = 3.407\ Mev$$

Since the energy is less than $4\ MeV$, we use Fig.7. e. It can be seen that at $x = 1$ the energy is $2.146\ MeV$, and at $x = 2$ the energy is $3.407\ MeV$.

DISCUSSION AND CONCLUSIONS

Alpha radiation has bad effects, it breaks the DNA strand and therefore the cell is destroyed or it survives and sustains its sleep, but its defect is wrong like mutation. remains Although these cells are regenerated by some specific enzymes, the small number that remain incorrect are likely to turn into cancer cells in the long run [3].

For example, within four hours, 97% of the 2,000 broken helix strands of DNA can be repaired. Mutated cells, which cause cancer, cause these cells to forget the other properties of the cell and the genetic code program set during survival and continue the process of mitosis on their own. Normally, in normal cells, the process of division or mitosis is done under a certain program and control according to the work and need of that organ. On the other hand, the body's immune system can recognize any defective cell as a tumor, so it destroys it with the help of certain cells such as macrophages [2].

If a strand of a chromosome is cut by radiation, the body has mechanisms, such as repair enzymes and certain proteins, to copy the broken DNA from one strand of DNA and replace it with the broken strand. connect and with the help of such a genetic technology, this defect can be eliminated again, but when both lines of chromosomes are cut once due to any reason, the probability of complete restoration is very low and it may be after many years. This cell turns into a cancer cell. If we assume that this damage reaches the sex cells of the body in the form of mutation, then this defect can occur in every single cell of the body of the children of the next generation. It means that if a person has been exposed to a very low level of nuclear radiation, for example, around a few millimeters of radiation, there is still a possibility that his children will be born with disabilities and

diseases, for example. Absence of eyes, trisomy 11, increased water in the skull or (Hydrocephalus), lack of organs blood cancer, and other diseases. The cutting edge is directly related to the equivalent energy line [1-5].

We have obtained the curve of the passage of $\alpha - particles$ through the air Fig. 4.e, determined the length of the mean path $R_0 = 1{,}99mm$ and the energy of $\alpha - particles\ E_{\propto max} = 3.407\ Mev$. Consequently, the α-particles induce DNA double-strand breaks (DSBs) in the nuclei of the hit peripheral blood mononuclear cell (PBMC) [7, 8, 9].

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CHET TILINI O‘QITISHDA VA MUSTAQIL TA’LIMDA O‘QITUVCHINING PSIXOLOGIK TA’MINOTI ZARURIYATI HAMDA AFZALLIKLARI

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ANNOTATSIYA

Ushbu maqolada chet tilini o`qitishda va mustaqil ta’lim jarayonida o‘qituvchining psixologik ta’minoti zaruriyati va uning samaradorligi o‘rganiladi. Mustaqil ta’lim faoliyatida o‘qituvchilar ko‘pincha ortiqcha stress va emotsional bosimni boshdan kechiradi, bu esa ular tomonidan taqdim etilayotgan ta’lim sifatiga ta’sir qilishi mumkin. Mazkur maqolada psixologik ta’minot usullari va afzalliklari, o‘qituvchilarning emotsional sog‘lig‘ini saqlash va ta’lim jarayonidagi samaradorlikni oshirish usullari tahlil qilinadi.

Kalit so‘zlar: mustaqil ta’lim, psixologik ta’minot, o‘qituvchilar, stress boshqarish, emotsional salomatlik.

ABSTRACT

This article examines the need for psychological support of the teacher during independent education and its effectiveness. In independent educational activities, teachers often experience excessive stress and emotional pressure, which can affect the quality of education provided by them. This article analyzes methods and benefits of psychological support, methods of maintaining teachers' emotional health and increasing efficiency in the educational process.

Keywords: independent education, psychological support, teachers, stress management, emotional health.

KIRISH

Ta’lim tizimida mustaqil ta’lim modeli tobora keng joriy etilib, o‘qituvchilarni o‘quv jarayonida yangi metodlardan foydalanishga, o‘quvchilarga mustaqil fikrlash imkoniyatini berishga undamoqda. Mustaqil ta’lim sharoitida o‘qituvchi faqat bilim beruvchi emas, balki yo‘nalish ko‘rsatuvchi sifatida namoyon bo‘ladi. Ammo bu jarayonda o‘qituvchilar ortiqcha ish yuklamasi, psixologik stress va bosim kabi qiyinchiliklarni boshdan kechirishadi. Shu sababli, psixologik ta’minotga ehtiyoj kuchayadi. Mustaqil ta’lim jarayonida o‘qituvchi nafaqat bilim beruvchi, balki o‘quvchilarning mustaqil faoliyatlarini yo‘naltiruvchi sifatida namoyon bo‘ladi. Bu esa ularga yangi majburiyatlar va yuqori darajada mas’uliyat yuklaydi. Shuningdek, ta’limda natija olishga yo‘naltirilgan bosim ham ularda ortiqcha stressni keltirib chiqarishi mumkin.

Stressning yuqori darajasi o‘qituvchilarning motivatsiyasini kamaytiradi va faoliyat sifatiga salbiy ta’sir ko‘rsatadi. Shuning uchun psixologik ta’minot o‘qituvchining stress bilan samarali kurashishini ta’minlashda muhim ahamiyat kasb etadi.

O‘qituvchilar uchun psixologik ta’minotning zarurligi va afzalliklari katta ahamiyatga ega bo‘lib, bu ularning samaradorligi va kasbiy rivojlanishini ta’minlaydi. Stressni boshqarish texnikalari va psixologik yordam xizmatlari orqali o‘qituvchilar nafaqat o‘zlarining, balki o‘quvchilarning ta’lim olish jarayonida ham yuqori natijalarga erishadilar. Shu bilan birga, mustaqil ta’limda psixologik qo‘llab-quvvatlashning tizimli ravishda amalga oshirilishi o‘qituvchilarning ruhiy va hissiy barqarorligini mustahkamlashga katta ko‘mak beradi.

METODOLOGIYA

Ushbu maqolada psixologik ta’minot zaruriyati va afzalliklarini aniqlash maqsadida ilmiy tadqiqotlar va tajribaviy kuzatishlar tahlil qilindi. Maqolada stressni boshqarish texnikalari, ta’limda motivatsiyani saqlash va o‘qituvchi uchun psixologik yordam xizmatlaridan foydalanish kabi omillar ko‘rib chiqiladi.

Hozirgi zamon o1qituvchisi o1z mutaxassisligiga oid bilimlar bilan birga, pedagogik va psixologik bilimlarni, hamda turli fan yo‟nalishlari bo`yicha maxsus bilimlarga ega bo`lgan, kasbiy tayyorgarlik, yuksak axloqiy fazilatlarni egallagan, ta`lim muassasalarida faoliyat ko‟rsatuvchi shaxsdir. Ushbu nuqtai nazardan hozirgi kunda quyidagi burch va masuliyatlar o`qituvchilardan talab qilinadi:

- O`qituvchi eng avvalo masuliyatni his etuvchi tarbiyachi, tajribali notiq, madaniyatva ma`rifat targ`ibotchisidir.

- O`qituvchi tabiatan o`quvchilarni seva olishi, o`z mehrini, his-tuyg`ularini har lahzada o`quvchilar ichki dunyosi bilan bog`lay olishi, ularning ham mehriga, hurmatiga sazovor bo`lishi kerak.

- O`qituvchi jamiyat ijtimoiy hayotida ro`y berayotgan o`zgarishlar, olib borilayotgan ijtimoiy-iqtisodiy islohotlar mohiyatini chuqur anglab etishi va ularga xolisona baho berib, bu borada o`quvchilarga to`g`ri, asosli ma`lumotlarni doimiy bera olishi lozim.

- Zamonaviy o`qituvchining ilm-fan, texnika va axborot-kommunikatsion texnologiyalari yangiliklaridan va yutuqlaridan xabardor bo`lib borishi talab etiladi. O`qituvchining o`rni va uning vazifalari, o`sib kelayotgan yosh avlodni tarbiyalash ishiga jamiyat va jamoatchilik tomonidan e`tibor qaratilishining naqadar muhim ahamiyatga egaligi aniqlanadi [6, 318].

NATIJALAR

O‘qituvchilarning mustaqil ta’lim jarayonidagi psixologik ta’minoti quyidagi natijalarga erishishda muhim rol o‘ynaydi:

1. Stress darajasini kamaytirish. Mustaqil ta’limda talab qilinadigan yuqori darajadagi faoliyat o‘qituvchilarning stress darajasini oshiradi. Psixologik ta’minot xizmatlari va stressni boshqarish texnikalari esa ularning stress darajasini sezilarli darajada kamaytiradi.

2. Emotsional barqarorlik va sog‘liqni saqlash. Psixologik yordam o‘qituvchilarning emotsional sog‘lig‘ini saqlashda muhim ahamiyat kasb etadi. Bu esa ular tomonidan ta’lim jarayonida yuqori sifatli faoliyat ko‘rsatishiga zamin yaratadi.

3. Ta’lim samaradorligi oshishi. O‘qituvchilarni emotsional jihatdan qo‘llab-quvvatlash ularning mustaqil ta’lim jarayonida eng yuqori samaradorlikka erishishiga yordam beradi. Buning natijasida o‘quvchilarning bilim darajasi va ta’limga bo‘lgan qiziqishi oshadi.

4. Kasbiy rivojlanish imkoniyatlari. Psixologik ta’minot, jumladan, motivatsiya va professional rivojlanishga doir treninglar o‘qituvchilarning kasbiy jihatdan o‘sishlariga yordam beradi va ularning faoliyatidagi yangi yutuqlarga erishishga turtki beradi.

O‘qituvchilarning kasbiy rivojlanishida psixologik ta’minot muhim ahamiyat kasb etadi. Motivatsiya va professional rivojlanishga yo‘naltirilgan treninglar ularning o‘z bilim va ko‘nikmalarini oshirishlariga katta yordam beradi. Psixologik qo‘llab-quvvatlash orqali o‘qituvchilar o‘z faoliyatlarida yangi yutuqlarga erishishga, innovatsion ta’lim metodlarini o‘zlashtirishga va darslarda samaradorlikni oshirishga turtki oladilar.

Kasbiy rivojlanish imkoniyatlarini ta’minlash uchun turli xil trening va seminarlar o‘tkazilishi mumkin. Bu treninglarda o‘qituvchilar stress va bosimlarni boshqarish, samarali muloqot o‘rnatish, hamkasblar bilan hamkorlikni mustahkamlash kabi qator psixologik va professional ko‘nikmalarni o‘rganadilar.

Mustaqil ta’limda o‘qituvchilarning psixologik ta’minotiga e’tibor qaratilishi kerak, chunki bu ularning stressni boshqarish, emotsional barqarorlikni saqlash va o‘z kasbiy faoliyatlarini samarali tashkil etishlariga yordam beradi. Psixologik ta’minot xizmatlari va qo‘llab-quvvatlash tarmoqlari orqali o‘qituvchilar o‘zlarini yaxshi his qilishadi, bu esa o‘quv jarayoniga ijobiy ta’sir ko‘rsatadi. Bundan tashqari, emotsional barqarorlik ularning shaxsiy rivojlanishlari uchun ham muhimdir, bu o‘qituvchining motivatsiyasi va qiziqishini saqlab qolish imkonini beradi.

XULOSA

O‘qituvchilarning psixologik ta’minoti mustaqil ta’limda muhim omil hisoblanadi. Bu nafaqat ularning emotsional va ruhiy salomatligini yaxshilash, balki ta’lim jarayonida sifatli xizmat

ko‘rsatishiga ham ijobiy ta’sir qiladi. Mustaqil ta’lim jarayonida o‘qituvchining psixologik ta’minotiga e’tibor qaratish orqali ular ko‘rsatayotgan ta’lim sifatini oshirish va o‘quvchilarga yanada samarali bilim berish mumkin. Shunday ekan, ta’lim muassasalari o‘qituvchilarga qo‘llab-quvvatlovchi psixologik xizmatlarni tashkil qilishlari va ularning kasbiy faoliyatini doimiy ravishda yuksaltirib borishlariga ko‘maklashishlari lozim.

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O‘ZBEK VA FRANSUZ TILLARIDAGI KIYIM-KECHAK NOMLARINI TARJIMA QILISHNING QIYINCHILIKLARI

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ANNOTATSIYA

Ushbu maqolada o‘zbek va fransuz tillaridagi kiyim-kechak nomlarini tarjima qilishdagi qiyinchiliklar o‘rganiladi. Tarjima tilshunosligida madaniy leksik birliklar, xususan, kiyim-kechak atamalarini tarjima qilish jarayoni turli madaniy farqlar va milliy kiyinish an'analariga bog‘liq ravishda murakkab jarayon hisoblanadi. Maqolada asosiy qiyinchiliklar sifatida madaniy farqlar, iqlim va geografik sharoitlarning ta'siri, hamda kiyim nomlarining milliy va semantik farqlari muhokama qilinadi. Tavsifiy tarjima va madaniy ekvivalentlar orqali bu muammolarni yengib o‘tish yo‘llari keltirilgan.

Kalit so‘zlar: tarjima qiyinchiliklari, madaniy farqlar, kiyim-kechak nomlari, O‘zbek tili, Fransuz tili, milliy kiyinish, semantik farqlar, tavsifiy tarjima, tarjima strategiyalari

ABSTRACT

This article examines the difficulties in translating clothing names in Uzbek and French languages. In translation linguistics, the process of translating cultural lexical units, in particular clothing terms, is a complex process depending on various cultural differences and national dress traditions. The article discusses cultural differences, the influence of climate and geographical conditions, and national and semantic differences in clothing names as the main difficulties. Ways to overcome these problems are presented through descriptive translation and cultural equivalents.

Keywords: translation difficulties, cultural differences, clothing names, Uzbek language, French language, national dress, semantic differences, descriptive translation, translation strategies.

KIRISH

Tarjima tilshunosligida madaniy leksik birliklar, xususan kiyim-kechak nomlarini tarjima qilish, ko‘p hollarda katta qiyinchiliklarni keltirib chiqaradi. Bu qiyinchiliklar asosan ikki millatning til va madaniyati o‘rtasidagi o‘ziga xos farqlar bilan bog‘liqdir. Ushbu

maqolada o‘zbek va fransuz tillaridagi kiyim-kechak nomlarini tarjima qilishda duch kelinadigan asosiy muammolar, shu jumladan madaniy farqlar, milliy kiyinish uslublari va iqlimning tarjimaga ta'siri tahlil qilinadi.

MATERIALLAR VA METODLAR

Mazkur maqolada o‘zbek va fransuz tillaridagi kiyim-kechak nomlarini tarjima qilishning qiyinchiliklari madaniy farqlar, so‘zlarning ma’no jihatdan noaniqligi, iqlim va geografik sharoitlar hamda milliy kiyinish uslublarini hisobga olib o‘rganildi. Tarjima jarayonida duch kelinadigan asosiy qiyinchiliklar tahlil qilindi va ilmiy adabiyotlar yordamida amaliy misollar keltirildi.

NATIJALAR

Madaniy farqlar va milliy kiyinish uslublari. O‘zbek va fransuz milliy kiyimlarida mavjud madaniy farqlar kiyim-kechak nomlarini tarjima qilishda aniq ekvivalent topish masalasida muhim ahamiyat kasb etadi. O‘zbek tilidagi "chopon" so‘zining fransuz tilidagi aniq ekvivalenti bo‘lmaganligi sababli, uni "manteau traditionnel" deb tarjima qilishga to‘g‘ri keladi. Ammo bu tarjima choponning o‘ziga xos madaniy xususiyatlarini to‘la ifodalab bera olmaydi. O‘zbekiston va Fransiyada kiyinish madaniyati an’anaviy jihatlari bilan ajralib turadi. O‘zbek milliy kiyimlari asosan paxta va ipakdan tikilgan, an'anaviy liboslar qatoriga ***chopon, do‘ppi, atlas ko‘ylaklar*** kiradi. Fransuz modasi esa xalqaro miqyosda tan olingan nafis va zamonaviy uslublari bilan mashhur bo‘lib, ***palto, kashmir sharf, beret*** kabi kiyimlar orqali milliy o‘ziga xosligini ifoda etadi. Shu sababli, ushbu liboslarni tarjima qilishda ba’zan to‘g‘ri ekvivalent topish qiyinlashadi.

1. Tarjima qiyinchiliklari va noan’anaviy qo‘llanilish. Ba’zi kiyim nomlari, masalan, o‘zbekcha "do‘ppi" va fransuzcha "beret", muayyan madaniyatga xos bo‘lib, tarjimada to‘g‘ri ekvivalent topilmasligi mumkin. Tarjimada ularning milliy madaniy ma’nolari va ijtimoiy konteksti hisobga olinishi zarur.

1. Iqlim va geografik omillar ta'siri. O‘zbekistonning iqlimi va Fransiyaning iqlimi kiyim-kechak nomlarini tarjima qilishda o‘ziga xos qiyinchiliklarni keltirib chiqaradi. Masalan, o‘zbek tilidagi "po‘stin" so‘zini fransuz tiliga tarjima qilishda, sovuq iqlim sharoitiga mos tushadigan kiyim ekvivalenti tanlanadi, biroq bu qalin teridan tikilgan po‘stin o‘zbek madaniyatida chuqur ildiz otgan. Ba’zi kiyim-kechak nomlari o‘ziga xos va faqat muayyan madaniyatga tegishli bo‘lib, tarjimada aniq ekvivalent topilmasligi mumkin. Masalan, o‘zbekcha **"do‘ppi"** va fransuzcha **"beret"** ikki xil bosh kiyim hisoblanadi, ammo ikkalasi ham milliy madaniyatni ifodalovchi asosiy elementlardan biri. Shu kabi, fransuz tilidagi **"cravate"** (galstuk) so‘zini o‘zbek tiliga

tarjima qilishda hech qanday qiyinchilik yuzaga kelmaydi. Ammo **"nœud papillon"** (kapalak galstuk) so‘zi o‘zbek madaniyatida keng tarqalmaganligi sababli tarjima jarayonida tushunarsiz bo‘lib qolishi mumkin. Bunday holatlarda fransuz tilidagi atamaning tushuntiruvli tarjimasi qo‘llaniladi.

2. Madaniy so‘zlarning semantik farqlari. O‘zbekcha "kamzul" va fransuzcha "gilet" so‘zlarining tarjimasida ular o‘z milliy kiyinish uslubiga bog‘liq bo‘lgan semantik farqlarni ifodalaydi. Bu farqlar tarjima jarayonida so‘zlarning to‘liq ekvivalentiga erishish uchun tushuntirish yoki tavsifiy usulni talab qiladi.

Ba'zan kiyim nomlarini to‘g‘ridan-to‘g‘ri tarjima qilishning iloji bo‘lmaganida, ularning tavsifiy tarjimasi amalga oshiriladi. Bu kiyimlarning shakli, materiali va funksiyasiga asoslangan tavsiflash orqali amalga oshiriladi. Masalan, o‘zbek tilidagi **"loh"** so‘zini tarjima qilishda, tavsif sifatida "moskva sochiq" yoki "bosh kiyim" kabilar qo‘llaniladi. Fransuz tilida esa bu turdagi bosh kiyimlar keng tarqalmaganligi sababli, fransuz o‘quvchisiga tushunarli bo‘lishi uchun tavsif qo‘llaniladi.

MUHOKAMA

O‘zbek va fransuz tillaridagi kiyim-kechak nomlarini tarjima qilishda asosiy qiyinchiliklar madaniy, iqlimiy va tarixiy omillar bilan bog‘liq. O‘zbek va fransuz millatlari o‘rtasidagi madaniy xususiyatlar kiyim-kechak terminologiyasiga sezilarli ta’sir ko‘rsatadi. Tarjima qiyinchiliklarini yengish uchun tavsifiy tarjima, madaniy kontekstni tushuntirish va ba’zi atamalarning tushuntiruvli izohlarini kiritish kabi usullar qo‘llanishi mumkin.

XULOSA

O‘zbek va fransuz tillaridagi kiyim-kechak nomlarini tarjima qilish qiyinchiliklari, asosan, madaniy farqlar, tarixiy va ijtimoiy omillar, hamda har bir til va madaniyatning o‘ziga xos terminologik tizimi bilan bog‘liq. Ushbu atamalarni to‘g‘ri tarjima qilish uchun tarjimon nafaqat ikki tilda mukammal bilimga ega bo‘lishi, balki madaniy kontekstni ham chuqur tushunishi zarur. To‘g‘ri tarjima uchun tavsifiy tarjima usulini qo‘llash, madaniy ekvivalentlar topish, va zarur bo‘lsa, so‘zlarning ma'nosini tushuntirish orqali qiyinchiliklar yengib o‘tilishi mumkin.

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BOLALARNING INGLIZ TILINI O‘RGANISH JARAYONIDA DUCH KELADIGAN QIYINCHILIKLAR (4-6 YOSH MISOLIDA)

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ANNOTATSIYA

Ushbu maqolada 4-6 yoshdagi bolalarning ingliz tilini o‘rganish jarayonida duch keladigan asosiy qiyinchiliklar o‘rganiladi. Til o‘rganishda bolalar eshitish-tushunish, talaffuz, grammatika va so‘z boyligi bo‘yicha qator muammolarga duch keladilar. Ushbu qiyinchiliklar bolaning fiziologik, psixologik rivojlanishi hamda madaniy omillarga bog‘liq. Maqolada bu qiyinchiliklarni yengib o‘tish uchun interaktiv metodlar, o‘yinlar va individual yondashuvlarning samaradorligi muhokama qilingan. Tadqiqot natijalari kelajakda til o‘rganish jarayonini yanada samarali tashkil etishga yordam beradigan takliflarni ilgari suradi.

Kalit so‘zlar: bolalar til o‘rganishi, eshitish qobiliyati, talaffuz qiyinchiliklari, grammatika, so‘z boyligi, o‘yin metodlari, madaniy omillar.

ABSTRACT

This article examines the main difficulties faced by children aged 4-6 in the process of learning English. When learning a language, children face a number of problems in listening comprehension, pronunciation, grammar and vocabulary. These difficulties depend on the child's physiological and psychological development and cultural factors. The article discusses the effectiveness of interactive methods, games and individual approaches to overcome these difficulties. The results of the research put forward proposals that will help organize the language learning process more effectively in the future.

Keywords: children's language learning, hearing ability, pronunciation difficulties, grammar, vocabulary, play methods, cultural factors.

KIRISH

Bolalarning til o‘rganish jarayoni hayotlarining dastlabki yillarida muhim ahamiyat kasb etadi, chunki bu davrda ular asosiy til ko‘nikmalarini rivojlantiradilar. Ammo bu jarayon ko‘plab qiyinchiliklarni o‘z ichiga oladi, jumladan, eshitish, talaffuz, til strukturasi va so‘z boyligi bilan bog‘liq muammolar. Ushbu maqolada bolalar duch keladigan asosiy qiyinchiliklar va ularni yengib o‘tish yo‘llari muhokama qilinadi. Bu jarayonni

chuqurroq tushunish uchun, maqolada ilmiy tadqiqotlar, til o‘rganish nazariyalari va amaliy tajribalar asosida tahlil olib boriladi.

Kichik maktab yoshidagi bolalarning yetakchi faoliyati bo`lgan o`qish shu yoshdagi bolalar psixikasi rivojidagi o`zgarishlarni belgilab beradi. Maktab ta`limi o`quvchining turmush tarzini, ijtimoiy mavqeini, sinf jamoasi va oila muhitidagi o`rnini o`zgartiradi. Uning vazifasi o`qishdan, bilim olish, ko`nikma va malakalarni egallash, o`zlashtirishdan iborat bo`lib qoladi [1, 255].

O`g`il bolalar va qizlar rivojlanish tempidagi o`zgarishlarda farqlanish mavjud bo`lib, qiz bolalar hamma tomondan rivojlanishda o`g`il bolalardan oldinga o`tib oladilar. Qiz bolalarning maktabdagi o`qish muvaffaqiyati samaradorligi ularda lingvistik qobiliyatlarining rivojlanganligiga bog`liq hisoblanadi. Maktab ta`limi esa ko`proq verballikka asoslangan. Professor B.R.Qodirov tadqiqotlarida ta’kidlanishicha, o‘g‘il bolalarda aniq fanlarga nisbatan layoqatlar ko‘proq rivojlangan bo‘lib, ko‘rish-fazoviy intellekt baland hisoblansa, qiz bolalarda nutq malakalari ko‘proq rivojlangan bo‘lib, tafakkur egiluvchanligi baland bo‘ladi.

MATERIALLAR VA USLUBLAR

Tadqiqotning asosiy metodologiyasi sifatida bolalar til o‘rganish jarayonida duch keladigan muammolarni o‘rganishga bag‘ishlangan ilmiy maqolalar va amaliy kuzatishlar tahlili tanlandi. O‘zbekiston va xalqaro miqyosda amalga oshirilgan tadqiqotlar ma'lumotlari o‘rganildi va to‘plangan natijalar asosida qiyinchiliklar bir nechta asosiy kategoriyalarga ajratildi: eshitish-tushunish qobiliyati, talaffuz, grammatika va so‘z boyligi. Tadqiqot uchun O‘zbekiston maktabgacha ta'lim muassasalarida til o‘rganayotgan 4-6 yoshli bolalar ishtirokchilari sifatida tanlandi. Kuzatish usuli orqali ularning darsdagi faoliyati va tilga oid qiyinchiliklari qayd etildi.

NATIJALAR

Tadqiqot natijalari shuni ko‘rsatadiki, bolalar asosan to‘rtta asosiy yo‘nalishda til o‘rganishda qiyinchiliklarga duch keladi:

1. Eshitish va tushunish muammolari: Yoshi kichik bolalarda eshitish orqali tilni tushunish qobiliyati to‘liq shakllanmagan bo‘lishi mumkin. Bu, ayniqsa, ikkinchi til sifatida o‘rganilayotgan til bo‘lsa, yanada murakkablashadi. Bolalar yangi so‘zlarni eshitganida ularni tushunishda va kontekstdan anglab olishda qiyinchiliklarga duch keladi.

2. Talaffuzdagi qiyinchiliklar: Bolalarning talaffuzi rivojlanmaganligi sababli ayrim tovushlar yoki so‘zlar noto‘g‘ri talaffuz qilinadi. Masalan, O‘zbekistonda ingliz tilini

o‘rganayotgan bolalar “th” yoki “r” tovushlarini o‘zlashtirishda muammolarga duch keladi.

3. Grammatika: Til grammatikasini o‘zlashtirish ko‘p vaqt va sabr talab qiladi. Bolalar yangi til grammatik qoidalarini tushunishda muammolarga duch keladilar. Misol uchun, ingliz tilida fe'llarning zamon shakllari yoki sifatdoshlar bolalar uchun qiyin qoidalar bo‘lib qolishi mumkin.

4. So‘z boyligi va lug‘at: Kichik yoshdagi bolalar yangi so‘zlarni eslab qolish va ularni to‘g‘ri kontekstdan foydalanishda ko‘pincha qiynaladi. Bu holat ular o‘rganayotgan tilning ularning ona tilidan sezilarli darajada farq qilishidan ham kelib chiqadi.

Ushbu natijalar bolalarning til o‘rganish jarayonida duch keladigan qiyinchiliklarning murakkabligini ko‘rsatadi. Xalqaro tadqiqotlar shuni tasdiqlaydiki, til o‘rganishdagi eshitish-tushunish qobiliyati yosh bolalar uchun eng katta qiyinchiliklardan biridir (Smith, 2018). Bundan tashqari, talaffuzni yaxshilash ko‘pincha maxsus fonetik mashqlar va o‘yinlar orqali erishiladi (Jones, 2020). Grammatik qoidalar va so‘z boyligini rivojlantirish uchun esa o‘qituvchi tomonidan tilga oid oddiy va aniq tushuntirishlar kiritilishi muhimdir. Shu bilan birga, amaliy tajribalar shuni ko‘rsatadiki, qiyinchiliklarni yengib o‘tish uchun til o‘rganish jarayonida individual yondashuv, ko‘p marta takrorlash va ijtimoiy interaktiv metodlarni qo‘llash zarur (Brown, 2019).

XULOSA

Bolalarning til o‘rganish jarayonida duch keladigan qiyinchiliklar ko‘p qirrali bo‘lib, ularning psixologik, fiziologik va madaniy omillarga bog‘liq ekanligi kuzatiladi. Ushbu qiyinchiliklarni yengish uchun mos metodlar qo‘llanilishi kerak. Til o‘rganish jarayonini yanada samarali qilish uchun esa interaktiv o‘yinlar, fonetik mashqlar, va tushuntiruvchi dars metodlari tavsiya etiladi. Shu bilan birga, o‘qituvchilar bolalarning individual qobiliyatlarini inobatga olib, moslashuvchan yondashuvni qo‘llashlari kerak.
Kelajakdagi tadqiqotlar bu qiyinchiliklarni yanada chuqurroq o‘rganish va ularni yengish strategiyalarini takomillashtirishga qaratilgan bo‘lishi zarur.

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КОНЧИЛИК КОРХОНАЛАРИДА ИШЛАТИЛАЁТГАН ТАСМАЛИ КОНВЕЙЕР РОЛИКЛАРИ ИШДАН ЧИҚИШИ ТАҲЛИЛИ

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АННОТАЦИЯ

Ушбу мақолада тасмали конвейерларнинг фойдали қазилмаларни ташиш ишларида тутган ўрни, дунёдаги ва Республикамиздаги кончилик саноати тасмали конвейерларида ва уларнинг роликларида юза келадиган тўхталишлар, улар оқибатида юзага келадиган камчиликлар ҳамда уларни бартараф этиш бўйича таҳлили кўриб чиқилган.

Калит сўзлар: Тасмали конвейерлар, резина матоли тасмалар, роликлар, подшипниклар, режали тўхталишлар, режасиз тўхталишлар, техник омил, технологик омил, конвейер унумдорлиги.

ABSTRACT

In this article, the role of belt conveyors in the transportation of minerals, the breakdowns of belt conveyors and their rollers in the mining industry in the world and in our Republic, the shortcomings caused by them, and the analysis of their elimination are considered.

Keywords: Belt conveyors, rubber fabric belts, rollers, bearings, planned stops, unplanned stops, technical factor, technological factor, conveyor productivity.

КИРИШ

Ўзбекистон Республикасида фойдали қазилмаларни очиқ усулда қазиб олаётган йирик кончилик корхоналарини ривожлантириш стратегияси, маҳсулот сифатини яхшилаш,

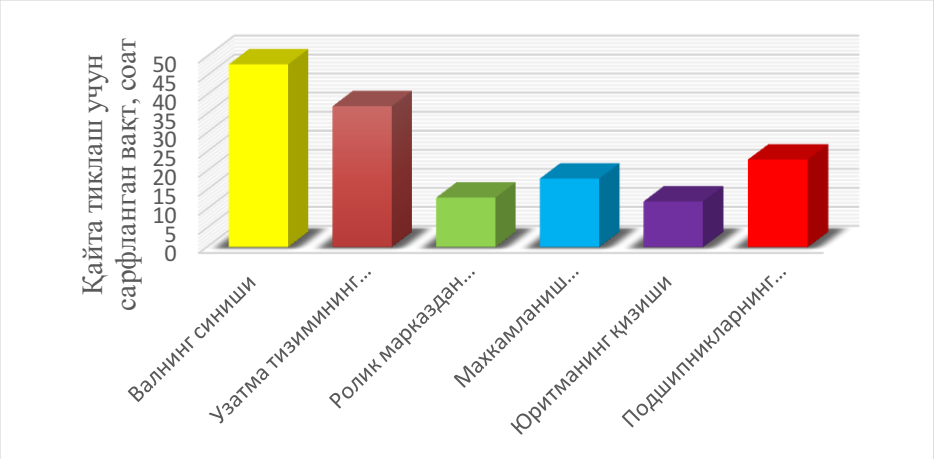
жаҳон бозоридаги рақобатбардошлигини янада ошириш ва ишлаб чиқариш ҳажмини босқичма-босқич оширишга қаратилган бўлиб, бунда, кончилик корхоналаридаги кончилик машиналари паркини жадал суъратларда янгилашга, модернизация қилишга ва корхонанинг унумдорлигини ошига олиб келувчи катта қувватли янги ускуналарни харид қилишга асосий эътибор қаратилмоқда.

Олимлар тамонидан олиб борилган илмий изланишлар натижасига кўра, тасмали конвейерларнинг иш жараёнини такомиллаштириш, енгил конструкцияни яратиш, юритма ва ишчи ускуналар элементларининг тизимли автоматик параметрлари ёрдамида бошқаришни амалга ошириш лозим. Ташиш ишларида юк оқимининг нотекис тақсимланиши юритмага ортиқча юклама тушиши, тасмаларнинг ейилиши ва узилиши, ролик таянчларига ортиқча юкламанинг тушиши натижасида тўхталишлар сонини орттиради. Тасмали конвейерларда юзага келадиган камчиликларни ўз вақтида бартараф этилиши ускунанинг унумдорлиги ошишига олиб келиб келиш билан бирга иқтисодий жиҳатдан самарадорликни ҳам таъминлаб беради.

АДАБИЁТЛАР ТАҲЛИЛИ

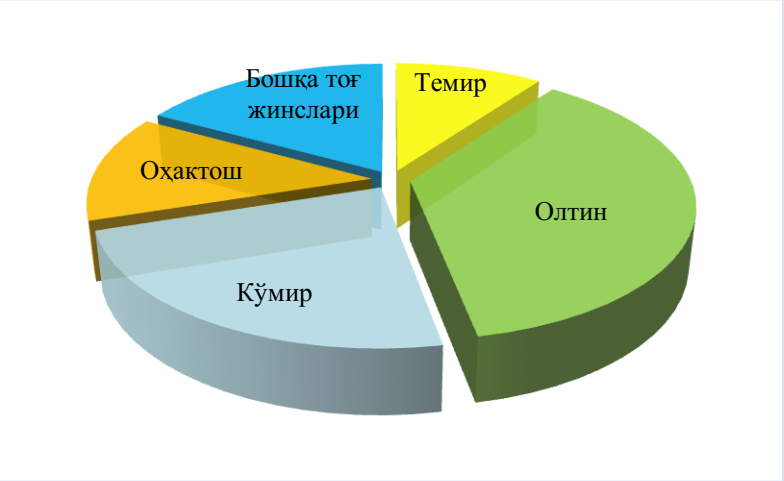
Кончилик саноатида ҳозирги вақтга келшиб асосан тасмали конвейерлардан фойдаланилмоқда. Тасмали конвейерлар ишчи элементларининг ишдан чиқиши орқали юзага келадиган тўхталишлари тақсимоти 1-расмда келтирилган.

1-расмга асосан, роликдаги валнинг синиши энг катта кўрсаткичга эга бўлиб, қайта тикланишига 48 соатни, узатма тизимидаги носозликлар 36 соатни, роликларнинг марказдан четлашиши 12 соатни, роликларни маҳкамлаш қисмларининг бўшалиши 17 соатни, юритмаларнинг қизиши 10 соатни ва подшипникларнинг едирилиши 22 соатни ташкил этади.



1-расм. Тасмали конвейерлар ишчи элементлари ишдан чиқиши орқали тўхтаб қолишларининг тақсимоти

Республикамиз ҳамда жаҳон кончилик саноати корхоналарида ташиладиган фойдали қазилманинг турига қараб тасмали конвейерларнинг қўлланилишини таҳлилий изланишлар натижаси асосида оҳактош конларида 10%, темир конларида 13%, кўмир конларида 17%, ва энг катта кўрсатгич сифатида олтин конларида тасмали конвейерлардан фойдаланиш 37% ни ташкил қилса, бошқа конларда 17% ни ташкил қилиши келтирилган. Тадқиқотларда қайд этилганидек, тасмали конвейерларнинг бошқа турдаги конвейерлардан фарқи, тоғ жинсларини ташишдаги харажатлар бошқа турдаги конвейерларга нисбатан анча пастлиги бўлиб, бу ташиш таннархининг пасайишини таъминлайди (2-расм).



2-расм. Қазиб олиш ишларида фойдали қазилма турларига қараб тасмали конвейерларнинг қўлланилиши.

Тасмали конвейерларнинг ишлаши, тасмали конвейерлар ва транспорт машиналарининг ишлаш шароитларини белгиловчи бир қанча омилларга боғлиқ бўлиб, ташиш ишларини лойиҳалашда ушбу омилларга эътибор қаратиш лозим (3-расм).

Тасмали конвейерларни ишлаб чиқариш даражасига ўзаро боғлиқ бўлган таркибий ва операцион омилларнинг таъсир кўрсатиши аниқланади. Ушбу омилларга техник хизмат кўрсатиш ҳамда таъмирлаш ходимлари малакаси ва сони, иш ва таъмирлашни ташкил этиш, куч узатиш механизмлари, механизмларнинг алмашинувчанлиги ва назорат қилиш қобилияти киради.

Тасмали конвейерлар техник ҳолатининг самарадорлигини баҳолаш ва таъминлашнинг илмий-услубий базасини таҳлил қилиш асосида, уларнинг иш шароитлари ва режимларига қараб ҳамда тасмали конвейерлар унумдорлигига таъсир этувчи омиллари таснифланади. Таснифга кўра, таъсир этувчи омиллар қуйидагилардан иборат: 1-

ускуналарнинг техник ҳолати; 2-иқлим омиллари; 3- конвейер транспортини бошқариш; 4-кон геологик ҳолати.



3-расм. Тасмали конвейерлар ресурсига таъсир этувчи омиллар

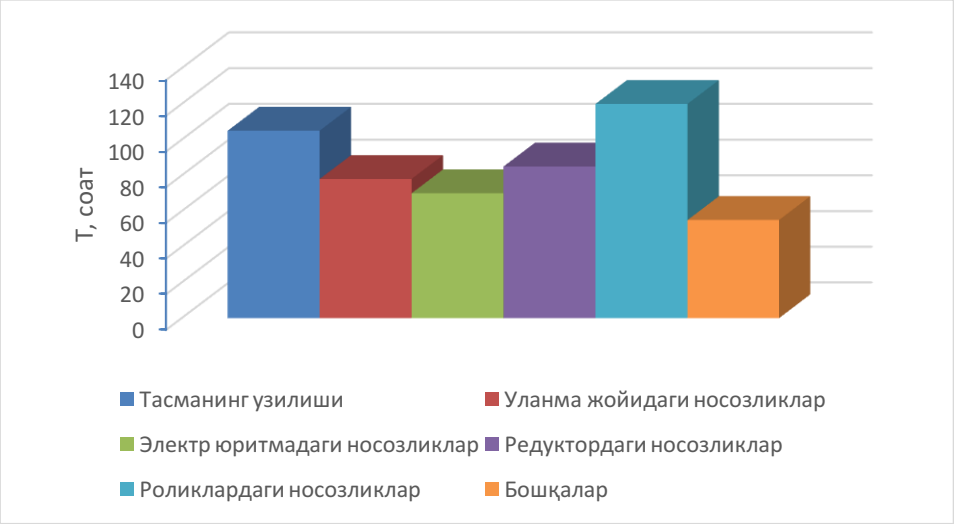


4-расм. Тасмали конвейерларни ишчи элементларига таъсир этувчи омиллари

Тасмали конвейерларнинг ишчи элементларига таъсир этувчи омиллари 1.7-расмда келтирилган. Унга асосан, технологик омиллар 10 % ни, ташкилий омиллар 14 % ни, иқлим омиллари 17 % ни, техник омиллари 19 % ни ва инсон техника омиллари 40 % ни ташкил этади.

4-расм асосида олимлар томонидан тасмали конвейерлар тасмаси ва роликлари техник ҳолатига таъсир этувчи омиллар сифатида, кончилик ишларига киришни

ташкиллаштириш, конвейерни бошқариш, тасмали конвейер техник ҳолатига эътибор қаратиш, иқлим, кон-геологик шароити, кон массаси ва ташиш ишларининг ташкил этилиш сифатига эътибор бериш айтиб ўтилган.



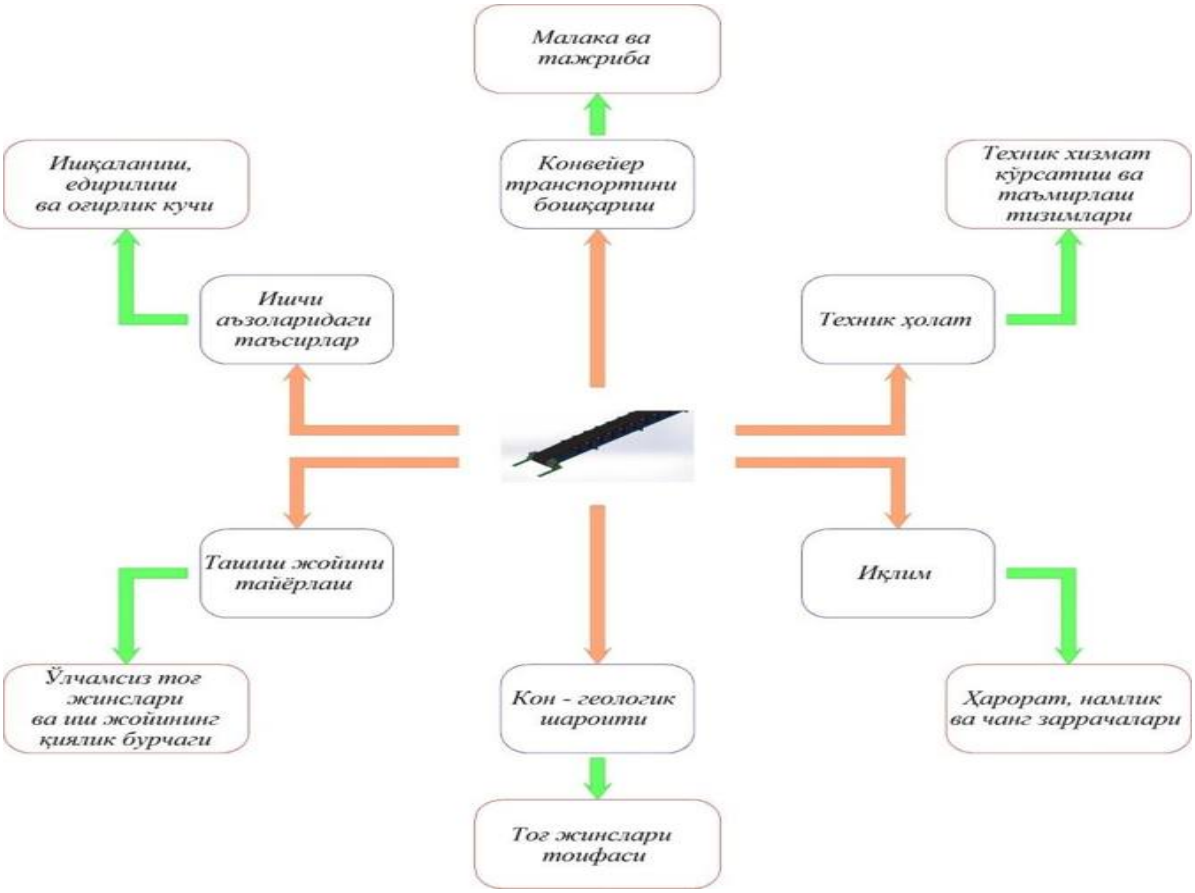
5-расм. Режали тўхталишлар даври

5-расмда тасмали конвейерларнинг режали тўхталишлар даврида режали таъмирлашда амалга ошириладиган ишлар, яъни, тасманинг узилиши ҳисобига тўхталишлар 107 соатни, уланма жойларидаги носозликлар 77 соатни, электр юритмалардаги носозликлар 64 соатни, редуктордаги носозликлар 82 соатни, роликлардаги носозликлар 120 соатни ва бошқа тўхталишлар 57 соатни ташкил қилади. Бу даврда тасмали конвейерларнинг ҳамма қисмлари кўздан кечирилади.

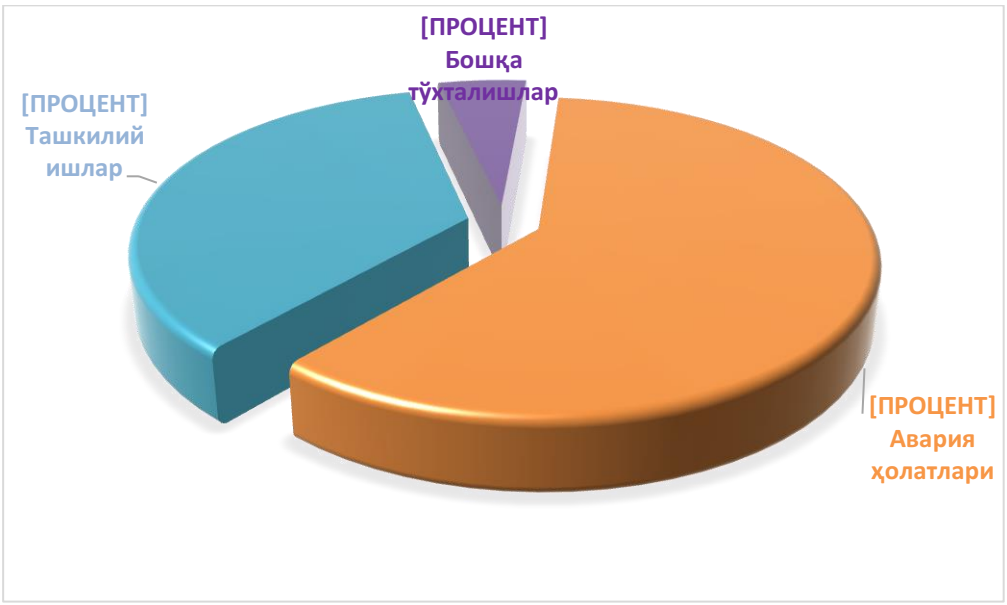
Тасмали конвейернинг тасмасининг ейилишини, узилишини ва роликларнинг ишдан чиқишини келтириб чиқарувчи омилларнинг таъсир даражаси фоизларда ифодаланганда: юк оқимининг нотекис тақсимланиши, конвейерни бошқариш, конвейернинг техник ҳолати, кон-геологик ва кон техник омиллари таъсири тадқиқотчилар илмий изланишларида келтириб ўтилган (5-расм).

Тасмали конвейерлар учун режасиз тўхталишлар даврида авария ҳолати 60 % ни, ташкилий ишлар 35 % ни, бошқа тўхталишлар 5% ни ташкил этади (7-расм).

Тасмали конвейерларни сменалараро кўздан кечирилмаслиги, машинист ҳамда техник хизмат кўрсатувчи ходимларнинг тажрибаси етишмаслиги ва механизмларни мукаммал таъмирланмаганлиги, режасиз тўхталишларга олиб келади.



6-расм. Тасмали конвейерлар тасмаси ва роликлари техник ҳолатига таъсир этувчи омиллар

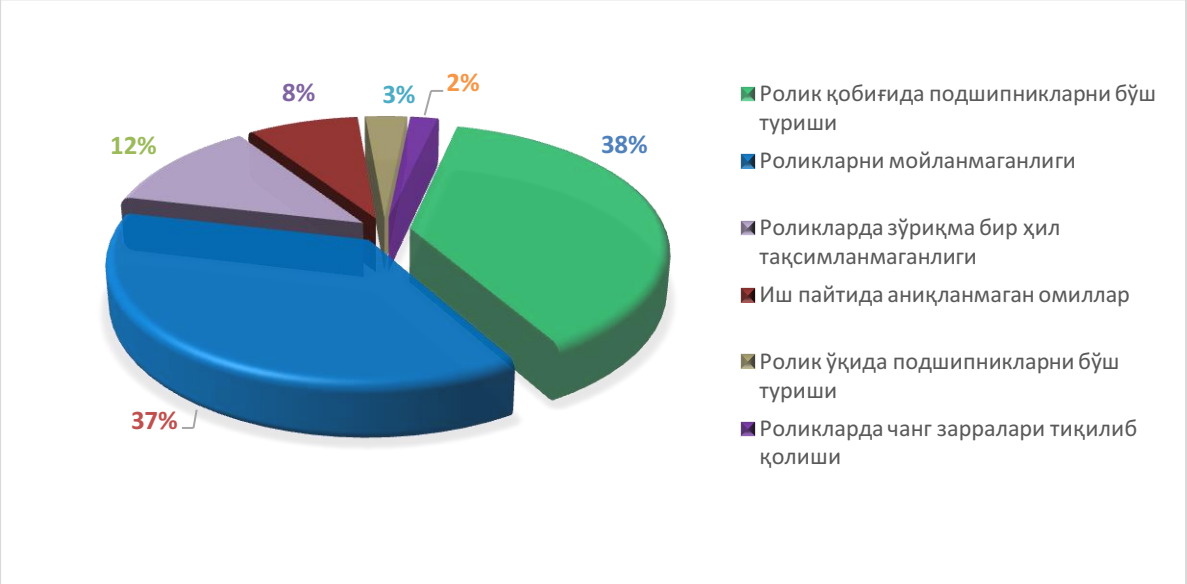


7-расм. Режасиз тўхталишлар даври

Қуйидаги патентлар тахлилларида RU2612766C2, RU2455427C2, RU2577870C2, RU2488661C2, RU2485317C2, SU1463870A1, RU2491389C2 тасмали конвейерлар тасмалари

уланишларига, роликлари конструкциясини оптималлаштиришга, ролик материалларини мустахкамлиги ошириш ва ишончли ишлаши кўриб чиқилган.

Олимлар тамонидан олиб борилган илмий-амалий изланишлар ва тадқиқотлар шуни кўрсатадики (8-расм), тасмали конвейер роликларнинг ишдан чиқишининг асосий сабаблари, техник хизмат кўрсатиш муддатида етарли даражада мойланмаслиги 37 % ни, чанг зарраларининг тиқилиб қолиши 38 % ни ташкил этади. Тасмали конвейер роликларини танлаш учун ишлаб чиқилган ягона таритиб қоидалар мавжуд бўлмаганлиги, турли хил конструкцияга, бир-биридан оғирлиги ва ўлчамлари билан фарқланиши, роликларнинг харакат тезликларининг ўзгариши, ролик подшипникларини алшмаштириш имконининг мавжуд эмаслиги, нотекис юк оқимидан тўғри ҳимояланмаганлиги роликларни қўллашда баъзи қийинчиликларни келтириб чиқаради. Айтиб ўтилган камчиликлар натижасида тасмали конвейер роликлари ишдан чиқади ва конвейернинг иш унумдорлигига тўғридан-тўғри таъсир қилади.



8-расм. Роликларнинг ишламай қолиш сабаблари

Тасмали конвейерлар узоқ ва ишончли ишлаши, бардошлилиги, ташилаётган юк оқимининг параметрлари, роликларга тушаётган юкламалар кўрсаткичлари, конвейер тасмаси тезлигини ўзгаришини кўриш мумкин. Конвейер роликларининг ишлаш муддатини ошириш юк оқимининг тушиш баландлигига, тасма юзаларида юк оқимининг хажмий тақсимланишига, ролик танячларига тушадиган юкламаларнинг тенг тақсимланишига ва конвейернинг ишчи параметларига боғлиқ. Роликлар таянчларига тушаётган зўриқма ва оғирлик кучларини тўғри тақсимланиши, роликларнинг ўрнатиш бурчагининг

аниқлиги, ролик таянчларининг конструкциясини такомиллаштириш масалаларини батафсил кўриб чиқиш лозим.

ХУЛОСАЛАР

1. Очиқ фойдали қазилма конларида тасмали конвейерларни қўллаш юқори самарадорликка олиб келади, бунга сабаб, тасмали конвейерлар бошқа конвейерларга нисбатан юқори унумдорликка эга, бу ўз навбатида, ковейернинг иш циклини бошқа конвейерларга нисбатан камайтиради, эксплуатация унумдорлигини эса оширади.

2. Кончилик корхоналари очиқ конларида эксплуатация қилинаётган тасмали конвейерларнинг авариялар сабабли юзага келадиган тўхталишларининг таҳлили шуни кўрсатадики, тасмали конвейерларнинг тайёргарлик коэффициенти бошқа конвейерларга нисбатан юқори. Бу эса тасмали конвейерларнинг бошқа конвейерларга нисбатан ишончлилигини исботлайди.

3. Тасмали конвейер роликларнинг ишдан чиқишининг асосий сабаблари, техник хизмат кўрсатиш муддатида мойланмаслиги 37 % ни, чанг зарраларининг тиқилиб қолиши 38 % ни ташкил этади. Роликдаги ушбу камчиликларни бартараф этиш конвейер унумдорлигининг ошишига олиб келади.

4. Карьер тасмали конвейерларининг самарадорлигини, ролик конструкциясини такомиллаштириш ва ишончлилигини ошириш асосида амалга оширилиши лозим. Бу эса, карьер тасмали конвейерларининг роликларининг айланмасдан тўхтаб қолиши ҳисобига келиб чиқувчи тўхталишларнинг асосий омилларни тадқиқ қилиш, тўхталишларни бартараф этиш асосида тасмали конвейерларнинг эксплуатацион самарадорлигини оширувчи техник ечимларни ишлаб чиқиш ва роликларга таьсир қилаётган кучларни математик моделлаштириш, ролик подшипникларини алмаштириш жараёнига тайёрлаш ишларини енгиллаштириш, ролик таянчларига тушаётган зўриқмаларни камайтириш ишлари устида илмий изланишлар олиб боришни талаб этади.

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ZAMONAVIY TA’LIM JARAYONIDA O‘QUVCHILARNING AXBOROT SAVODXONLIGINI OSHIRISHDA NEYROPEDAGOGIK TEXNOLOGIYALAR

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ANNOTATSIYA

Maqolada o‘quvchilarda axborot savodxonligini rivojlantirishda neyropedagogik texnologiyalardan foydalanishning nazariy va amaliy jihatlari yoritilgan. Axborot savodxonligi tushunchasi va uning ta’limdagi ahamiyati tadqiq qilingan bo‘lib, neyropedagogik texnologiyalarning o‘quv jarayonidagi o‘rni, ularning ta’sir omillari va rivojlantirish strategiyalari tavsiflangan. Neyropedagogika vositalari yordamida o‘quvchilarda axborotni tanqidiy qabul qilish, qayta ishlash va xavfsizlik madaniyatini shakllantirish bo‘yicha metodologik asoslar va amaliy usullar bayon qilingan. Tadqiqot natijalari neyropedagogik yondashuvlarning o‘quvchilarning umumiy bilim va kognitiv ko‘nikmalariga ijobiy ta’sirini ko‘rsatadi.

Kalit so‘zlar: axborot savodxonligi, neyropedagogika, kognitiv rivojlanish, ta’lim texnologiyalari, axborot xavfsizligi, tanqidiy fikrlash, o‘quv jarayoni.

НЕЙРОПЕДАГОГИЧЕСКИЕ ТЕХНОЛОГИИ ДЛЯ ПОВЫШЕНИЯ ИНФОРМАЦИОННОЙ ГРАМОТНОСТИ УЧАЩИХСЯ В СОВРЕМЕННОМ ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ

АННОТАЦИЯ

В статье освещены теоретические и практические аспекты использования нейропедагогических технологий для развития информационной грамотности у учащихся. Исследуются понятие информационной грамотности и её значение в образовании, описываются роль нейропедагогических технологий в учебном процессе, факторы их влияния и стратегии развития. Изложены методологические основы и практические методы формирования у учащихся навыков критического восприятия, обработки информации и культуры безопасности с использованием нейропедагогических инструментов. Результаты исследования показывают положительное влияние нейропедагогического подхода на общий уровень знаний и когнитивные навыки учащихся.

Ключевые слова: информационная грамотность, нейропедагогика, когнитивное развитие, образовательные

технологии, информационная безопасность, критическое мышление, образовательный процесс.

NEUROPEDAGOGICAL TECHNOLOGIES FOR ENHANCING STUDENTS' INFORMATION LITERACY IN THE MODERN EDUCATIONAL PROCESS

ABSTRACT

The article explores theoretical and practical aspects of using neuropedagogical technologies to develop information literacy in students. It investigates the concept of information literacy and its importance in education, describing the role of neuropedagogical technologies in the learning process, their influencing factors, and strategies for development. Methodological foundations and practical methods are outlined for cultivating critical information reception, processing, and information security awareness among students through neuropedagogical tools. The research results demonstrate the positive impact of neuropedagogical approaches on students' overall knowledge and cognitive skills.

Keywords: information literacy, neuropedagogy, cognitive development, educational technologies, information security, critical thinking, educational process.

KIRISH

Axborot savodxonligi — bu zamonaviy jamiyatda har bir shaxs uchun muhim bo‘lgan va kundalik hayotda axborotni anglash, tahlil qilish, baholash hamda undan samarali foydalanish qobiliyatini anglatadi. Axborot texnologiyalari tezkor rivojlanayotgan zamonda bu ko‘nikmalar juda katta ahamiyatga ega. Axborot savodxonligi faqat axborotni qabul qilish va saqlashdan iborat emas, balki uni tanqidiy mulohaza bilan qayta ishlash, to‘g‘ri manbalarni topish, tahlil qilish va undan ijobiy maqsadlarda foydalanishni ham qamrab oladi. Zamonaviy ta’lim jarayonida axborot savodxonligi shaxsning dunyoqarashi va ijtimoiy faolligida muhim rol o‘ynaydi, shuningdek, uning mustaqil fikrlashi va shaxsiy pozitsiyasini shakllantirishda asosiy omillardan biridir. Shuning uchun axborot savodxonligi ta’lim tizimidagi har bir o‘quvchida shakllantirilishi kerak bo‘lgan muhim kompetensiyalardan biri hisoblanadi.

Axborot savodxonligini rivojlantirishning ahamiyati hozirgi globallashgan jamiyatda yanada oshmoqda. Texnologik rivojlanish natijasida har kuni turli axborot kanallari orqali ko‘plab ma’lumotlar tarqalmoqda va o‘quvchilar bu axborot oqimida yo‘qolib qolmaslik, to‘g‘ri va ishonchli ma’lumotlarni ajrata olish qobiliyatiga ega bo‘lishlari zarur.

Axborot savodxonligi orqali o‘quvchilarda axborotni tahlil qilish, tanqidiy fikrlash, undan to‘g‘ri foydalanish hamda yolg‘on axborotlardan himoyalanish qobiliyatlari shakllanadi. Bu ko‘nikmalar nafaqat ta’lim jarayonida, balki ularning hayotining turli jabhalarida ham foydali bo‘ladi. Axborot savodxonligini rivojlantirish nafaqat shaxsiy rivojlanish uchun, balki jamiyatda mas’uliyatli va bilimli fuqarolarni tarbiyalash uchun ham muhimdir.

METODOLOGIK ASOS

Maqolaning metodologik asoslarini belgilashda quyidagi taniqli tadqiqotchilarning ishlari asos bo‘ldi. Ular neyropedagogika, axborot savodxonligi, kognitiv psixologiya hamda ta’limdagi neyrotexnologiyalar sohasida ilmiy tadqiqotlarni amalga oshirgan: Vigotskiy L.S. (Vygotsky, L.S.): Uning kognitiv rivojlanish nazariyasi va ta’lim jarayonidagi “yaqin rivojlanish zonasi” konsepsiyasi ta’limda shaxsiy yondashuvni ishlab chiqishda muhim o‘rin tutadi. [1] Piaje J. (Piaget, J.): Bolalarda kognitiv rivojlanish va tafakkur shakllanishiga oid Piaje tadqiqotlari o‘quvchilarning axborotni tushunish va tahlil qilish qobiliyatlarini rivojlantirish metodologiyasiga asos bo‘ladi. [2] Xebb D.O. (Hebb, D.O.): Neyropsixologiyaga asoslangan ta’lim texnologiyalarining nazariy asoslarini belgilashda Xebbning “Hujayra aloqalari” nazariyasi (Hebbian learning theory) muhim ahamiyatga ega. Uning neyronlarning o‘zaro bog‘liqlikdagi rivojlanishi haqidagi tushunchalari neyropedagogik texnologiyalarning nazariy asosini tashkil etadi. [3] Gardner G. (Gardner, H.): Gardnerning “ko‘p intellektlar nazariyasi” neyropedagogik yondashuvlar asosini kengaytirib, o‘quvchilarning turli intellektual xususiyatlariga moslashtirilgan metodlar ishlab chiqishga yordam beradi. [4]

Maqolaning metodologik asoslarini mustahkamlash maqsadida o‘zbek olimlarining ta’limda axborot savodxonligi, kognitiv rivojlanish va neyropedagogika sohalarida olib borgan tadqiqotlariga ham tayanildi. Quyida ushbu sohada ilmiy ishlar olib borgan ayrim o‘zbek olimlari va ularning tadqiqotlari keltiriladi: N.Z. Alimova axborot savodxonligi va media savodxonlikni rivojlantirish, shuningdek, ta’limda axborot manbalaridan samarali foydalanishga qaratilgan tadqiqotlari ushbu maqolaning metodologiyasini belgilashda muhim ahamiyat kasb etadi. [5] M.A.Turdiyev O‘zbekistonda axborot xavfsizligi va axborot savodxonligini shakllantirish bo‘yicha tadqiqotlari orqali o‘quvchilarda axborotni tanqidiy tahlil qilish va xavfsizlik qoidalariga rioya qilish ko‘nikmalarini rivojlantirish yo‘nalishlarini belgilab berdi. [6] Z.I.Karimova O‘zbekiston ta’lim tizimida kognitiv rivojlanish va shaxsga moslashtirilgan ta’lim metodlarini ishlab chiqish bo‘yicha izlanishlari neyropedagogika sohasida muhim manba bo‘lib xizmat qiladi. [7] Sh.A.Mirzayev neyropedagogika

va ta’limda axborot texnologiyalaridan foydalanish bo‘yicha tadqiqotlari o‘quvchilarning axborotni qabul qilish, qayta ishlash va tahlil qilish qobiliyatlarini rivojlantirishga qaratilgan. [8]

Tadqiqotda adekvat holatda o‘rganishni ta’minlashga qaratilgan nazariy (qiyosiy-taqqoslash, modellashtirish, tahliliy-sintetik), diagnostik (so‘rovlar, test, kuzatish, suhbat), prognostik (ekspert baholash, mustaqil baholarni umumlashtirish), pedagogik eksperiment va matematik (ma’lumotlarni statistik qayta ishlash, natijalarni grafik tasvirlash) metodlar majmuidan foydalanildi.

TADQIQOT NATIJALARI

Neyropedagogik texnologiyalarning ta’limdagi o‘rni va imkoniyatlari. Neyropedagogik texnologiyalar ta’limda yangi imkoniyatlarni ochib bermoqda. Bu texnologiyalar o‘quvchilarning kognitiv jarayonlarini yaxshiroq tushunishga va ularning o‘quv jarayonini samarali boshqarishga yordam beradi. Neyropedagogika orqali inson miyasining ishlash mexanizmlarini tushunish orqali o‘quv jarayonini yaxshilash imkoniyati paydo bo‘ladi. Neyropedagogik texnologiyalar inson miyasining axborotni qabul qilish, qayta ishlash va eslab qolish xususiyatlarini hisobga olgan holda, ta’lim jarayonini shaxsga moslashtirishga imkon yaratadi. Shuningdek, bu texnologiyalar axborotni to‘g‘ri va samarali qabul qilish, uni tahlil qilish, xotira va diqqatni rivojlantirish kabi jarayonlarni tezlashtirish va samaradorligini oshirishga yordam beradi.

Zamonaviy ta’limda neyropedagogik texnologiyalardan foydalanish o‘quvchilarda axborot savodxonligini shakllantirish va rivojlantirishda muhim vosita bo‘lishi mumkin. Ular yordamida o‘quvchilarning bilim olish jarayoni yanada qiziqarli va interaktiv bo‘lib, turli axborot manbalari bilan to‘g‘ri ishlash ko‘nikmalari samarali shakllanadi. [1; 74]

Neyropedagogika haqida tushuncha va uning ta’lim jarayoniga ta’siri. Neyropedagogika — bu ta’lim jarayonini inson miyasining kognitiv va psixofiziologik xususiyatlarini hisobga olgan holda rivojlantirishni maqsad qilgan ilm-fan sohasidir. Neyropedagogika zamonaviy neyrobiologiya, psixologiya va pedagogikaning o‘zaro bog‘liq nuqtalarida shakllangan bo‘lib, o‘quvchilarning o‘quv jarayonini miyaning ishlash xususiyatlarini hisobga olgan holda individuallashtirishni maqsad qiladi. Bu fan insonning miyasi qanday qilib ma’lumotni qabul qiladi, qayta ishlaydi va eslab qoladi, shuningdek, qanday sharoitlarda o‘quv jarayonini samarali tashkil etish mumkinligini o‘rganadi.

Neyropedagogika ta’lim jarayonida o‘quvchilarning ehtiyojlari va ularning o‘quv jarayoniga qobiliyatlarini hisobga olgan holda shaxsiy yondashuvni rivojlantiradi. Masalan, har bir

insonning axborotni qabul qilish va tushunish jarayonlari o‘zgacha bo‘lishi mumkin. Shu sababli, neyropedagogikaga asoslangan metodikalar orqali ta’lim jarayonini individuallashtirish va o‘quvchilarning shaxsiy rivojlanish yo‘nalishlarini samarali tashkil etish mumkin. [4; 152]

Axborotni qabul qilish va qayta ishlash jarayonlariga neyro yondashuvning qo‘llanilishi axborot savodxonligini rivojlantirishda muhim ahamiyat kasb etadi. Axborotni miyaning turli zonalarida qayta ishlash jarayoni ma’lum usullar orqali tizimlashtirilgan bo‘lib, bu jarayonlarning samaradorligi ta’lim jarayoniga bevosita ta’sir ko‘rsatadi. Neyro yondashuv, masalan, axborotni qabul qilishda diqqatni jamlash, xotirani yaxshilash va turli kognitiv ko‘nikmalarni rivojlantirishga yordam beradi.

Axborot savodxonligini rivojlantirish jarayonida o‘quvchilar ma’lumotni tizimli qabul qilish, tanqidiy qayta ishlash va uning mohiyatini anglashga o‘rgatiladi. Neyro yondashuv yordamida, axborotni eshitish, o‘qish, yozish va vizual ko‘rish orqali qabul qilish jarayonlarini yaxshilash mumkin. Masalan, vizual ma’lumotlarni miyada saqlash tezroq va uzoqroq bo‘ladi, shu sababli grafiklar, diagrammalar va tasvirli ma’lumotlar axborotni qabul qilish jarayonini osonlashtiradi. Shuningdek, audio vositalar yordamida ham xotirani rivojlantirish mumkin.

TADQIQOT NATIJALARI

Axborot savodxonligiga ta’sir etuvchi neyropsixologik omillar. Axborot savodxonligiga ta’sir etuvchi neyropsixologik omillar — bu o‘quvchilarning miya faoliyatini shakllantirish va rivojlantirish jarayonida asosiy ahamiyat kasb etuvchi jihatlardir. Bu omillar orasida diqqatni jamlash qobiliyati, xotirani rivojlantirish, tanqidiy fikrlash qobiliyati, va kognitiv jarayonlarning moslashuvchanligi kabi qator xususiyatlar mavjud.

1. **Diqqat va diqqatni jamlash:** Axborot savodxonligida diqqatni jamlash va fokusni saqlash muhim ahamiyatga ega. Odam miyasi ma’lum vaqt davomida bir axborot manbasiga diqqatni jamlay oladi, va bu vaqt chegaralangan bo‘lishi mumkin. Neyropedagogik yondashuvlar diqqatni jamlash ko‘nikmasini rivojlantirish va axborotni sifatli qabul qilishda qo‘llaniladi.

2. **Xotira:** Axborot savodxonligini shakllantirishda xotiraning ahamiyati katta, chunki inson axborotni qabul qilishi bilan birga uni eslab qolish qobiliyatiga ham ega bo‘lishi kerak. Miyada axborotni to‘g‘ri saqlash va zarur paytda qayta ishlab chiqarish ko‘nikmalarini shakllantirish neyropedagogik texnologiyalar yordamida amalga oshiriladi. Masalan, o‘quv jarayonida ma’lumotlarni qisqa muddatli va uzoq muddatli xotiraga saqlash metodlari qo‘llanadi.

3. **Tanqidiy fikrlash va tahlil qobiliyati:** Axborot savodxonligi faqat ma’lumotni qabul qilishni emas, balki uni tahlil qilish, tanqidiy yondoshish va to‘g‘ri qaror qabul qilishni ham talab qiladi. Bu jarayonda neyropsixologik yondashuvlar orqali tanqidiy fikrlash qobiliyati rivojlantiriladi, va o‘quvchilarning axborotga nisbatan tahlil qobiliyati oshadi.

4. **Kognitiv moslashuvchanlik:** Miyaning o‘zgaruvchan sharoitlarga moslashish qobiliyatini rivojlantirish axborotni qabul qilish va qayta ishlash jarayonida muhim omillardan biri hisoblanadi. Axborot savodxonligi doimiy ravishda yangi ma’lumotlarga moslashishni talab qilgani sababli neyropedagogik yondashuvlar orqali o‘quvchilarda kognitiv moslashuvchanlik shakllantiriladi. [3; 98-99]

Shunday qilib, axborot savodxonligini rivojlantirishda neyropedagogik texnologiyalardan samarali foydalanish orqali o‘quvchilarda diqqat, xotira, tanqidiy fikrlash va kognitiv moslashuvchanlik kabi ko‘nikmalarni rivojlantirish mumkin. Bu ko‘nikmalar axborotni anglash va undan samarali foydalanishga yordam beradi.

Axborotni tadqiq etish va tahlil qilishda neyropedagogik strategiyalarni qo‘llash. Axborot savodxonligini shakllantirishda o‘quvchilarga axborotni tadqiq etish va tahlil qilish ko‘nikmalarini singdirish muhimdir. Neyropedagogik yondashuvlarda miyaning ma’lumotni qayta ishlash jarayonlariga ta’sir ko‘rsatadigan strategiyalardan foydalaniladi, bu esa o‘quvchilarning tahlil qilish qobiliyatini rivojlantirishga yordam beradi. Masalan, ma’lumotlarni vizuallashtirish, klasterlar yordamida axborotni tashkillashtirish, assotsiatsiyalar orqali mavzuni chuqur tushunish kabi neyropedagogik usullar qo‘llanadi. Bu strategiyalar o‘quvchilarga ma’lumotlarni tizimli ravishda tahlil qilish, uning mohiyatini tushunish va turli nuqtayi nazarlarni o‘rganishga yordam beradi. Bunday yondashuv, shuningdek, ularning tadqiqot olib borish qobiliyatini kuchaytirib, ma’lumotlarga tanqidiy yondoshishni rag‘batlantiradi.

Axborot manbalari bilan ishlashda xotira va diqqatni rivojlantirish usullari. Axborot savodxonligini shakllantirish jarayonida xotira va diqqat muhim ahamiyatga ega. Neyropedagogik texnologiyalar bu jarayonlarda o‘quvchilarning diqqatini jamlash va axborotni uzoq muddatli xotiraga saqlashni rivojlantirishda foydali vosita bo‘lib xizmat qiladi. Masalan, ma’lumotlarni qisqa muddatli xotiradan uzoq muddatli xotiraga o‘tkazish uchun takrorlash, turli formatlardagi materiallarni qo‘llash (matn, tasvir, audio) va multimediaviy vositalardan foydalanish usullari qo‘llaniladi. Diqqatni jamlash uchun vizual signallar va taassurotlarga boy materiallar yordamida ma’lumotlarni qabul qilish samaradorligini oshirish mumkin. Bu usullar o‘quvchilarga axborot manbalarini yodda

saqlashda, diqqatni barqaror saqlashda va o‘quv jarayonida ma’lumotni qayta ishlashda yordam beradi. [6; 78]

Mazmunli ma’lumotlarni tanlash va tanqidiy mulohaza qilish qobiliyatini oshirish. Axborot savodxonligining muhim jihatlaridan biri o‘quvchilarni mazmunli va ishonchli ma’lumotlarni tanlashga o‘rgatishdir. Neyropedagogik texnologiyalar yordamida ular axborotni tanlash va tahlil qilishda tanqidiy fikrlash qobiliyatini rivojlantirishadi. Masalan, o‘quvchilarga ma’lumotlarni tekshirish, ularning ishonchliligini baholash va noto‘g‘ri axborotdan himoyalanishga o‘rgatuvchi mashg‘ulotlar o‘tkaziladi. Neyropedagogik yondashuvlar yordamida tanqidiy mulohaza qilish va axborot manbalariga nisbatan mos ravishda yondoshish usullari ishlab chiqiladi.

Masalan, turli manbalarni solishtirish, dalillarni tahlil qilish, kontekstni anglash va xabarlarning maqsadga muvofiqligini baholash kabi neyropedagogik vositalar orqali o‘quvchilarning tanqidiy fikrlash qobiliyati oshiriladi. Bu ularga noto‘g‘ri yoki chalkashtiruvchi ma’lumotlardan himoyalanishni o‘rgatib, tanqidiy qarashni rivojlantirishga yordam beradi. Natijada, o‘quvchilar axborotni faqat qabul qilish emas, balki uni tahlil qilish va undan to‘g‘ri foydalanish qobiliyatiga ega bo‘ladilar, bu esa ularning axborot savodxonligini yanada yuqori darajaga olib chiqadi.

Elektron resurslar va media vositalari orqali axborot savodxonligini rivojlantirish. Zamonaviy ta’lim jarayonida elektron resurslar va media vositalar axborot savodxonligini rivojlantirishda muhim vosita hisoblanadi. Neyropedagogik texnologiyalar yordamida elektron manbalardan samarali foydalanish, ma’lumotlarni tahlil qilish va media savodxonlikni rivojlantirish mumkin. O‘quvchilarga elektron kitoblar, onlayn ensiklopediyalar, ma’lumotlar bazalari, interaktiv veb-saytlar va ijtimoiy media manbalaridan samarali foydalanishni o‘rgatish, ularning axborotni to‘g‘ri qabul qilish va unga tanqidiy qarash qobiliyatini rivojlantiradi. [8; 47] Shuningdek, vizual kontentlar va interaktiv tadqiqot vositalari miyada ma’lumotni tezroq qabul qilish va uzoq muddatli xotirada saqlash uchun yordam beradi. Masalan, video, infografika, virtual simulyatsiyalar va animatsiyalar kabi vositalar axborotni qabul qilish jarayonini jonlantirib, o‘quvchilarga ko‘plab ma’lumotlarning mohiyatini tushunishga yordam beradi.

Axborotni tez qabul qilish va qayta ishlashni rivojlantirish uchun kognitiv mashqlar. Axborot savodxonligini rivojlantirishda axborotni tez qabul qilish va qayta ishlash qobiliyati muhim ahamiyatga ega. Neyropedagogik texnologiyalarga asoslangan kognitiv mashqlar axborotni tezkorlik bilan qabul qilish, uni tahlil qilish va xotirada saqlash qobiliyatlarini rivojlantiradi. Masalan, tez o‘qish mashg‘ulotlari, vizual materiallar yordamida yodlash texnikalari, diqqatni jamlash uchun maxsus mashqlar va qisqa

muddatli xotirani uzoq muddatli xotiraga aylantiruvchi texnika va usullardan foydalanish mumkin. Kognitiv mashqlar orqali o‘quvchilarning xotirasi va diqqati rivojlanadi, shuningdek, ma’lumotlarni tizimli tarzda qabul qilish va undan foydalanish ko‘nikmalari shakllanadi. Bu mashqlar o‘quvchilarga yuqori tezlikda ma’lumot qabul qilish va uni tahlil qilishda yordam beradi, shu bilan ularning axborot savodxonligi yanada samarali rivojlanadi.

O‘quvchilarda axborot xavfsizligi madaniyatini shakllantirishda neyro metodlarning o‘rni. Axborot xavfsizligi madaniyati axborot savodxonligining ajralmas qismi bo‘lib, o‘quvchilarda axborotni ishonchli manbalardan olish, ularni tekshirish va noto‘g‘ri axborotdan himoyalanish ko‘nikmalarini rivojlantirishda muhim ahamiyat kasb etadi. Neyropedagogik texnologiyalar yordamida axborot xavfsizligi madaniyatini shakllantirishda maxsus neyro metodlar qo‘llaniladi. Masalan, turli axborot manbalari bilan tanishtirish, axborotni tanqidiy tahlil qilish va uning ishonchliligini baholashga qaratilgan mashg‘ulotlar orqali o‘quvchilarda axborot xavfsizligiga bo‘lgan mas’uliyat shakllantiriladi.

Neyropedagogik yondashuvlar o‘quvchilarga feyk yangiliklar, noto‘g‘ri ma’lumotlar va tahdidlardan himoyalanishda yordam beradi. Ularga ma’lumot manbalarini tekshirish, faktlarni tahlil qilish va axborot xavfsizligiga qaratilgan shaxsiy himoya mexanizmlarini rivojlantirish bo‘yicha yo‘l-yo‘riqlar o‘rgatiladi. Bu orqali o‘quvchilar axborotni tanlashda ehtiyotkorlikka va xavfsizlikka e’tibor qaratishga o‘rganadilar, bu esa ularni noto‘g‘ri ma’lumot va tahdidlardan himoya qiladi. [5; 187]

Shunday qilib, neyropedagogik texnologiyalar axborot savodxonligini rivojlantirishda axborotni qabul qilish, qayta ishlash va xavfsizlikka e’tibor qaratish kabi muhim ko‘nikmalarni shakllantirishda samarali amaliy usullar hisoblanadi.

XULOSA

Neyropedagogik texnologiyalar axborot savodxonligini rivojlantirishda katta ahamiyatga ega bo‘lib, ularning samaradorligi ta’lim jarayonida o‘quvchilarning ma’lumotni qabul qilish, tahlil qilish va uni to‘g‘ri qayta ishlash qobiliyatlarini shakllantirishda yaqqol namoyon bo‘ladi. Bu texnologiyalar o‘quvchilarga axborotni to‘g‘ri tushunish va tanqidiy mulohaza yuritish imkonini beradi, ularning bilim va ko‘nikmalarini yaxshilashga yordam beradi.

Neyropedagogik texnologiyalardan foydalanish o‘quvchilarning umumiy bilim saviyasi va kognitiv ko‘nikmalariga ijobiy ta’sir ko‘rsatadi. Ular axborot xavfsizligi, tanqidiy fikrlash, diqqatni jamlash va xotirani mustahkamlash kabi ko‘nikmalarni rivojlantirish orqali o‘quvchilarning bilim olish jarayonini samarali qiladi. Bu esa ularni zamonaviy jamiyat

talablariga mos bilimli va mas’uliyatli shaxslar sifatida tayyorlashga yordam beradi.

Ta’limda neyropedagogik texnologiyalarni keng qo‘llash bo‘yicha tavsiyalar. Ta’lim jarayonida neyropedagogik texnologiyalarni keng qo‘llash o‘quvchilarning axborot savodxonligini rivojlantirishda muhimdir. Ta’lim muassasalarida neyropedagogik usullardan foydalanib, o‘quv jarayonini individuallashtirish, axborot xavfsizligi madaniyatini shakllantirish va kognitiv mashqlarni keng tatbiq etish tavsiya etiladi. Bu yondashuv o‘quvchilarning axborotga bo‘lgan munosabatini yaxshilash va ularni bilimli, o‘ylayotgan shaxslar sifatida shakllantirishga xizmat qiladi.

Umuman, neyropedagogik texnologiyalarni qo‘llash orqali o‘quvchilarning axborot savodxonligi hamda kognitiv rivojlanishi yuqori samaradorlikka erishadi, bu esa ta’lim sifatini oshirishda muhim omil bo‘ladi.

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O‘QUVCHILARDA AXBOROT BILAN ISHLASH MADANIYATINI SHAKLLANTIRISHDA MEDIA SAVODXONLIKNING O‘RNI

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ANNOTATSIYA

Ushbu maqolada o‘quvchilarda axborot bilan ishlash madaniyatini shakllantirishda media savodxonlikni oshirishda tanqidiy fikrlashni rivojlantirishga qaratilgan mashqlar, Media savodxonlikni rivojlantiruvchi darslar, Axborot manbalarini qiyoslash va tahlil qilish ko‘nikmalarini shakllantiruvchi topshiriqlar, Internet va elektron manbalardan foydalanish, axborot xavfsizligi va shaxsiy ma’lumotlarni himoya qilish, onlayn ta’lim platformalaridan foydalanish, dasturiy ta’minot va axborot tahlili vositalari haqida so‘z yuritamiz.

Kalit so‘zlar: media, internet, axborot, onlayn ta’lim, dasturiy ta’minot, interaktiv muhi, feyk axborotlar, pedagogik yondashuvlar, zamonaviy ta’lim.

THE ROLE OF MEDIA LITERACY IN FORMING THE CULTURE OF WORKING WITH INFORMATION IN STUDENTS

ABSTRACT

In this article, exercises aimed at the development of critical thinking in the formation of a culture of working with information in students, lessons that develop media literacy, tasks that form the skills of comparing and analyzing information sources, using the Internet and electronic resources, information security and personal data protection we are talking about doing, using online learning platforms, software and information analysis tools.

Keywords: media, Internet, information, online education, software, interactive information, fake information, pedagogical approaches, modern education.

Kirish

Media savodxonlik va axborot xavfsizligi zamonaviy axborot jamiyatida, ayniqsa, globallashuv davrida o‘ta muhim ahamiyat kasb etmoqda. Internet, ijtimoiy tarmoqlar va ommaviy axborot vositalari yoshlar hayotida keng tarqalgan bo‘lib, ular turli xil axborotlar manbalariga tez va keng miqyosda kirish imkoniyatiga ega bo‘ldilar. Biroq bu axborot oqimlari orasida turli xil yolg‘on axborotlar, manipulyasiya qilingan ma’lumotlar va shaxsiy ma’lumotlar xavfsizligiga tahdid soluvchi omillar ham mavjud.

Yoshlarni bu xavflarga qarshi himoya qilish va ularni yolg‘on axborotdan saqlash uchun media savodxonlik va axborot xavfsizligi bo‘yicha bilimlarni rivojlantirish zarur.

Globallashuv davrida axborot madaniyati yoshlar uchun muhim tushunchaga aylandi, chunki ular turli xil axborot manbalari bilan doimo bog‘liq bo‘ladi va bu manbalarni to‘g‘ri tushunib, tahlil qilish muhimdir. Global axborot maydonida yoshlar turli xil madaniyatlar, tillar, iqtisodiy va ijtimoiy munosabatlar haqida turli xil ma’lumotlarga duch keladilar. Axborot oqimlarining shiddatli o‘sishi natijasida yoshlarning axborotni qabul qilish va uni tahlil qilish qobiliyatini shakllantirishga ehtiyoj ortib bormoqda.

Richard Rorti kabi olimlar globallashuvning axborot oqimlariga ta’siri haqida shunday ta’kidlaydilar: “Globallashuv axborotga kirish imkoniyatlarini kengaytirayotgan bo‘lsa-da, bu jarayonda yoshlarning tanqidiy fikrlash qobiliyatini rivojlantirish zarurati ham oshib bormoqda”[1]. Bu fikrdan kelib chiqadigan bo‘lsak, globallashuv axborot oqimlarini kengaytirib, har qanday axborotni tez qabul qilish imkoniyatini bersa ham, uning ishonchliligi va haqqoniyligi to‘g‘risidagi masalalarni hal qilish uchun yoshlarni tanqidiy fikrlashga tayyorlash zarur.

Bundan tashqari, Jon Dyui globallashuv jarayonining yoshlar axborot madaniyatiga ta’sirini tahlil qilib shunday deydi: “Globallashuv jarayonida yoshlar turli axborot oqimlariga duch keladilar va bu axborotni tahlil qilish, tanlab olish va manbalarni solishtirish ko‘nikmalarini talab qiladi” [2]. Ushbu fikr globallashuvning yoshlar axborot bilan ishlash qobiliyatiga bevosita ta’sirini ko‘rsatadi.

Asosiy qism

Media savodxonlik bu insonning media vositalarini tushunishi, ulardan to‘g‘ri foydalanishi, tarqatilayotgan axborotning mazmunini tanqidiy baholashi va media manbalarning turli taraflarini chuqur tushunib yetishi bilan bog‘liq ko‘nikmalar majmuasidir. Zamonaviy jamiyatda media savodxonlik turli axborotlarni qabul qilishda yoshlarning tanqidiy fikrlash qobiliyatini oshirishga yordam beradi. Chunki media savodxonlik axborotning haqqoniyligi, mazmuni, maqsadlari va ortida turgan manfaatlarni tushunib, unga tanqidiy yondashish qobiliyatini rivojlantiradi.

Media savodxonlik, ayniqsa, ijtimoiy tarmoqlarda tarqatiladigan axborotlarga nisbatan ahamiyat kasb etadi. Bugungi kunda yoshlar internetdagi turli media platformalar orqali axborot olishadi. Bu manbalarda tarqatiladigan axborotlar ba’zan yolg‘on, noto‘g‘ri yoki manipulyasiya qilingan bo‘lishi mumkin. Rene Xobbs shunday ta’kidlaydi: "Media savodxonlik — bu insonlarni axborot manbalarini to‘g‘ri baholashga, ularning haqqoniyligini tekshirishga va turli manbalarning ta’siridan himoyalanishga

yordam beradigan muhim bilimlardir" (Iqtibos). Bu fikrdan ko‘rinib turibdiki, media savodxonlik yoshlarni media orqali tarqatilayotgan turli axborotlardan to‘g‘ri foydalanishga va yolg‘on axborotlarga qarshi himoyalanishga tayyorlaydi.

Media savodxonlik yoshlarni axborot manbalarini tanlab, ularning ishonchliligi va haqqoniyligini tekshirishga undaydi. Media savodxonlikning rivojlanishi yoshlarga axborotni tanqidiy qabul qilish, uni tahlil qilish va uning manbaini aniqlashda yordam beradi. Shu tariqa, yoshlar turli media manbalarni tahlil qilib, ularning ortida turgan manfaatlarni tushunib yetadilar va yolg‘on axborotlar ta’siriga tushmaydilar.

Media savodxonlik va axborot xavfsizligini ta’minlash bo‘yicha bilim va ko‘nikmalar yoshlarni internet va media vositalaridan oqilona foydalanishga tayyorlaydi. Masalan, shaxsiy ma’lumotlarni himoya qilish, internetda tarqatilayotgan ma’lumotlarning ishonchliligini tekshirish va yolg‘on axborotlarning ta’siridan himoyalanish kabi ko‘nikmalar ularning axborot xavfsizligiga bo‘lgan yondashuvlarini kuchaytiradi.

Globallashuv davrida internet va ijtimoiy tarmoqlar orqali yolg‘on axborotlarning keng tarqalishi yoshlar uchun katta tahdiddir. Yolg‘on axborotlar (feyk axborotlar) — bu ma’lumotlarning manipulyasiya qilingan yoki noto‘g‘ri yoki maxsus maqsadlarda tarqatilgan turlaridir. Yoshlar bunday axborotlarga oson tushib qolishlari va uning ta’siriga berilgan holda noto‘g‘ri xulosalar chiqarishlari mumkin.

Media savodxonlik va axborot xavfsizligi yoshlar uchun zamonaviy axborot jamiyatida faol ishtirok etish va turli axborot manbalaridan to‘g‘ri foydalanish uchun muhim ko‘nikmalar hisoblanadi. Globallashuv davrida turli yolg‘on axborotlar, manipulyasiya qilingan ma’lumotlar va shaxsiy ma’lumotlar xavflaridan himoyalanish uchun yoshlar media savodxonlikka va axborot xavfsizligiga o‘rganishlari zarur. Axborot xavfsizligiga e’tibor qaratilmagan holda, yoshlar turli xakerlik hujumlari yoki shaxsiy ma’lumotlarning fosh etilishi bilan bog‘liq muammolarga duch kelishi mumkin. Media savodxonlik va axborot xavfsizligi yoshlarni axborot manbalarini to‘g‘ri baholashga, yolg‘on axborotlarga qarshi kurashishga va shaxsiy ma’lumotlarni himoya qilishga tayyorlaydi. Frensis Fukuyama ham globallashuvning yoshlar bilimlari va axborot bilan ishlash madaniyatiga ta’sirini alohida qayd etib, shunday fikr bildiradi: “Yoshlarni global axborot oqimlariga tayyorlash jamiyatning kelajagini yaratishda muhim o‘rin tutadi, chunki axborotga to‘g‘ri yondashuv va uni to‘g‘ri qo‘llay olish ko‘nikmasi jamiyatning intellektual salohiyatini oshiradi” [4]. Bu fikrdan yoshlarni globallashuv sharoitida axborot bilan ishlashga tayyorlash jamiyatdagi intellektual va ma’naviy salohiyatni mustahkamlashga xizmat qiladi, degan xulosaga kelish mumkin.

Globallashuv jarayoni axborot oqimlarining tezkor va turli manbalar orqali tarqalishiga sabab bo‘ldi, bu esa yoshlarni axborot bilan ishlashga tayyorlash zaruratini keltirib chiqardi. Globallashuv sharoitida axborot manbalari ko‘payib, yolg‘on va manipulyasiya qilingan axborotlar tarqalishi kuchaygani sababli, axborot madaniyatini shakllantirish muhim ahamiyat kasb etmoqda. Yoshlarni tanqidiy fikrlashga, axborotni tahlil qilishga va axborot xavfsizligiga amal qilishga o‘rgatish globallashuvning salbiy ta’sirlariga qarshi samarali vosita hisoblanadi. Axborot madaniyati yoshlar uchun global axborot jamiyatida o‘z o‘rnini topishga yordam beradi, ularni tanqidiy fikrlovchi va axborotni to‘g‘ri qo‘llovchi faol shaxslar etib tarbiyalaydi.

Axborot madaniyati ta’lim jarayonining muhim qismi hisoblanadi. Axborotni to‘g‘ri qabul qilish, tahlil qilish, tanqidiy fikrlash qobiliyatini rivojlantirish va axborotni turli kontekstlarda qo‘llash axborot madaniyatining markaziy jihatlaridir. Bu ko‘nikmalar yoshlarning bilish jarayonida, axborot bilan ishlashda va ta’limdagi samaradorliklarini oshirishda asosiy o‘rin tutadi. Axborot madaniyati yoshlar uchun axborotni tushunib yetish, uni to‘g‘ri tahlil qilish va ishonchli manbalardan foydalanishda yordam beradi.

Zamonaviy ta’lim jarayonida axborotni to‘g‘ri qabul qilish va uni tahlil qilish ko‘nikmalari o‘quvchilarning muvaffaqiyati uchun juda muhimdir. Bugungi kunda yoshlar turli xil axborot manbalaridan foydalanishadi: internet, ijtimoiy tarmoqlar, kitoblar va media vositalari. Ammo axborot manbalari turli mazmunga ega bo‘lishi va turli darajada ishonchli bo‘lishi mumkin, shu sababli axborotni to‘g‘ri qabul qilish va uni tahlil qilish qobiliyati yoshlarning o‘quv jarayonida samarali bilim olishiga yordam beradi.

Axborotni to‘g‘ri qabul qilish va tahlil qilish ko‘nikmalari yoshlarning bilish jarayonini boyitadi. Masalan, ular turli axborot manbalarini qiyoslab, ma’lumotning haqqoniyligi va mazmunini baholashni o‘rganadilar. Bu jarayon o‘quvchilarning bilimini chuqurlashtirishga yordam beradi, chunki axborotni faol qabul qilgan yoshlar uni qayta ishlab, undan yangicha xulosalar chiqarish imkoniyatiga ega bo‘ladilar. To‘g‘ri qabul qilish va tahlil qilish yoshlarga o‘quv jarayonida turli mavzularni chuqurroq tushunib yetishga yordam beradi. Masalan, tarix yoki adabiyot darslarida yoshlar turli manbalardan ma’lumot olib, ularni qiyoslaydilar va tahlil qiladilar. Bu jarayon axborotni faqatgina qabul qilishdan tashqari, uni chuqur tahlil qilish, manba ortida turgan nuqtai nazarni aniqlash va ishonchli ma’lumotlarga ega bo‘lish ko‘nikmasini rivojlantiradi.

O‘quv jarayonida axborotni tahlil qilish qobiliyati yoshlarning muvaffaqiyatli ta’lim olishida muhim ahamiyat kasb etadi. Axborotni tahlil qilish orqali yoshlar ma’lumotlarning

mantiqiyligini, dalillar asosida to‘g‘ri xulosa chiqarish qobiliyatini shakllantiradilar. Axborot madaniyati shakllangan o‘quvchilar axborotni tanlab oladi, uni turli manbalardan tahlil qiladi va to‘g‘ri xulosalar chiqaradi, bu esa ta’limda yuqori natijalarga erishishga yordam beradi.

Tanqidiy fikrlash zamonaviy ta’limning markaziy ko‘nikmalaridan biri bo‘lib, axborot madaniyati uni rivojlantirishda muhim o‘rin tutadi. Axborot madaniyati yoshlarni axborotni faol qabul qilishga, uning mazmunini tanqidiy tahlil qilishga va mantiqiy xulosalar chiqarishga undaydi. Tanqidiy fikrlash axborotni faqat qabul qilish emas, balki uning mantiqiy tuzilishi va mazmunini chuqur tushunishni o‘z ichiga oladi. Bu jarayon yoshlarning intellektual rivojlanishiga katta ta’sir qiladi.

Tanqidiy fikrlash yoshlarni axborotni mustaqil qabul qilish va uni turli nuqtai nazarlardan baholashga yordam beradi. Masalan, yoshlar ijtimoiy tarmoqlardagi axborotlarni yoki ommaviy axborot vositalaridagi ma’lumotlarni tanqidiy tahlil qilib, uning ortida turgan manfaatlar va maqsadlarni aniqlashga o‘rganadilar. Bu jarayon ularning fikrlash qobiliyatini oshiradi va ularni turli axborot manbalarini qiyoslab, mantiqqa asoslangan xulosalar chiqarishga yordam beradi.

Axborot madaniyati tanqidiy fikrlashni rivojlantirish uchun turli manbalarni qiyoslash, ularning ishonchliligini baholash va ulardan yangicha xulosalar chiqarishga yordam beradi. Masalan, yoshlar matematika yoki biologiya darslaridagi nazariy ma’lumotlarni amaliyotda qo‘llashlari mumkin bo‘lgan holatlarni o‘rganib, ma’lumotlarni tahlil qilish va ularni turli kontekstlarda qo‘llash qobiliyatini rivojlantiradilar. Bu jarayon yoshlarni tanqidiy fikrlovchi va bilimlarini amalda qo‘llovchi shaxslarga aylantiradi.

Tanqidiy fikrlashning rivojlanishi ta’lim jarayonini to‘g‘ri yo‘naltirishga yordam beradi. Axborot madaniyati yoshlarni faol o‘quvchilarga aylantiradi, chunki ular axborotni avtomatik ravishda qabul qilish o‘rniga, uni tanqidiy baholashga va yangicha nuqtai nazardan tahlil qilishga o‘rganadilar. Tanqidiy fikrlash qobiliyati yoshlarga murakkab muammolarni tushunish va ularga yangicha yondashuvlarni ishlab chiqishda katta yordam beradi.

Axborot madaniyati ta’lim jarayonida yoshlarning axborot bilan ishlash va tanqidiy fikrlash ko‘nikmalarini rivojlantirishda markaziy o‘rin tutadi. Axborotni to‘g‘ri qabul qilish va tahlil qilish qobiliyati o‘quvchilarga bilimlarni chuqurroq o‘zlashtirish, manbalarni qiyoslab, ulardan yangicha xulosalar chiqarishga yordam beradi. Shu bilan birga, axborot madaniyati tanqidiy fikrlashni rivojlantirishning asosiy vositasi bo‘lib, yoshlarni axborotni chuqur tahlil qilish, turli nuqtai nazarlardan baholash va to‘g‘ri xulosalar chiqarish qobiliyatini shakllantiradi.

Axborot madaniyati yordamida yoshlar zamonaviy axborot

jamiyatida muvaffaqiyatli faoliyat yuritadigan, tanqidiy fikrlovchi va bilimlarni to‘g‘ri qo‘llaydigan shaxslarga aylanadilar.

Axborot jamiyatining rivojlanishi yoshlar va jamiyatning boshqa qatlamlari uchun yangi imkoniyatlarni ochib bersa-da, axborot oqimlaridagi yolg‘on axborotlar va axborot zaharlanishi (informasion toksiklik) katta tahdidlardan biriga aylandi. Bugungi kunda turli manbalardan tarqatilayotgan yolg‘on axborotlar yoshlarning fikrlash jarayonini buzishi, ularni noto‘g‘ri xulosalar chiqarishga olib kelishi mumkin. Shu sababli, yoshlarni yolg‘on axborotlarni tanish va unga qarshi kurashishga o‘rgatish axborot madaniyatining muhim vazifasi hisoblanadi.

Yolg‘on axborotlar, yoki feyk ma’lumotlar, jamiyatga turli maqsadlarda tarqatiladi: ijtimoiy-siyosiy manipulyasiya, iqtisodiy manfaatlar yoki jamoat fikrini o‘zgartirish kabi sabablar uchun. Axborot jamiyatida axborot tarqatishning osonlashgani sababli yolg‘on axborotlar jadal tarqaladi va ko‘pincha haqiqiy axborot bilan aralashib ketadi. Bu holat yoshlar va boshqa foydalanuvchilarni yolg‘on ma’lumotlarning ta’siriga tushib qolishiga sabab bo‘ladi.

Axborot madaniyatining asosiy maqsadlaridan biri yoshlarni yolg‘on axborotlarni tanish va ularga qarshi kurashish ko‘nikmalariga o‘rgatishdir. Bu jarayon yoshlarning tanqidiy fikrlashini rivojlantirishga qaratilgan bo‘lib, ular axborotni qabul qilishda va uning haqqoniyligini tekshirishda faol ishtirok etishlari zarur. Yoshlar axborotni tahlil qilish, uning manbaini aniqlash va turli manbalardan qiyoslash orqali yolg‘on axborotlarni aniqlay olishlari lozim. Rene Xobbs shunday ta’kidlaydi: “Yolg‘on axborotlardan himoyalanish uchun yoshlar axborotni tanqidiy baholash ko‘nikmalariga ega bo‘lishlari kerak, chunki bu ularni manipulyasiyadan himoya qiladi” [3].

Axborot madaniyati yoshlarga axborot manbalarini qiyoslash, ularning ishonchliligini baholash va ulardan kelib chiquvchi manfaatlarni tushunib yetishga yordam beradi. Masalan, ijtimoiy tarmoqlarda yoki xabarlar veb-saytlarida tarqatiladigan axborotlarni turli manbalardan tekshirib, yoshlar uning haqiqiyligini aniqlashlari mumkin. Bu jarayonda yoshlar axborotni chuqur tahlil qilib, yolg‘on ma’lumotlardan himoyalanishga o‘rganadilar.

Shuningdek, axborot madaniyati yoshlarni turli turdagi yolg‘on axborotlar (masalan, fotoshoplangan rasmlar, noto‘g‘ri mantiqiy xulosalar, to‘qib chiqarilgan faktlar) bilan ishlashda yangicha yondashuvlar ishlab chiqishga undaydi. Yolg‘on axborotlar yoshlarning fikrlash jarayonini buzishi va ularning turli manipulyasiyalar ta’siriga tushib qolishiga olib kelishi mumkin. Shu bois, axborot madaniyati yoshlarni yolg‘on axborotlarga qarshi kurashish ko‘nikmalariga tayyorlaydi, ularni faol fikrlovchi va axborotni tahlil qiluvchi shaxslarga aylantiradi.

Zamonaviy ta’lim jarayonida axborot madaniyatini shakllantirishga qaratilgan pedagogik yondashuvlar juda katta ahamiyat kasb etadi. Axborot bilan ishlash madaniyatining shakllanishi uchun faqat axborotni tushunish ko‘nikmalari emas, balki uni tahlil qilish, tanqidiy baholash, ishonchli manbalarni ajratish va axborot xavfsizligiga rioya qilish kabi muhim jihatlar o‘rgatilishi lozim. Bu jarayonda turli pedagogik yondashuvlar va interaktiv metodlardan foydalanish muhim o‘rin tutadi.

Axborot madaniyatini rivojlantirishga qaratilgan pedagogik yondashuvlar yoshlarni axborot bilan faol va tanqidiy ishlashga o‘rgatadi. Axborot jamiyatida yoshlar turli xil axborot manbalari bilan ishlashlari, ularni tahlil qilishlari va ishonchli manbalarni tanlashni o‘rganishlari zarur. Bizningcha, bu jarayonda quyidagi pedagogik yondashuvlar va interaktiv metodlar alohida o‘rin tutadi:

1. **Tanqidiy fikrlashni rivojlantirishga qaratilgan mashqlar**: axborot madaniyatini shakllantirishda tanqidiy fikrlashni rivojlantirish muhim hisoblanadi. Bu jarayon yoshlarni axborotni avtomatik ravishda qabul qilish emas, balki uning mazmunini chuqur tahlil qilish va unga savollar berishga o‘rgatadi. Masalan, darslarda turli mavzular bo‘yicha ma’lumotlarni qiyoslash, ularni tahlil qilish va manbalarning haqqoniyligini baholash orqali yoshlarning tanqidiy fikrlash qobiliyati oshiriladi.

2. **Media savodxonlikni rivojlantiruvchi darslar**: axborot madaniyatining muhim jihatlaridan biri media savodxonlikdir. Bu darslar orqali yoshlar turli media manbalardan foydalanishda tanqidiy yondashishni, media orqali tarqatilayotgan axborotni to‘g‘ri tushunishni va manbaga qarab axborotni baholashni o‘rganadilar. Masalan, televizion yoki internet manbalaridagi axborotni tahlil qilish, turli axborotlarni qiyoslash, ularning maqsad va manfaatlarini aniqlash yoshlarga media savodxonlikni rivojlantirishga yordam beradi.

3. **Axborot manbalarini qiyoslash va tahlil qilish ko‘nikmalarini shakllantiruvchi topshiriqlar**: axborot madaniyatini shakllantirish uchun axborot manbalarini qiyoslash va ularning ishonchliligini baholash ko‘nikmalari alohida o‘rin tutadi. Dars jarayonida yoshlar turli manbalardan ma’lumot olib, ularni tahlil qilishga yo‘naltirilgan topshiriqlar bajaradilar. Bu metod axborotni faqat qabul qilish emas, balki uni tahlil qilish va turli manbalardan kelgan ma’lumotlarni qiyoslash qobiliyatini rivojlantirishga qaratilgan.

4. **Guruhlarda ishlash va muammolarni birgalikda hal qilish**: axborot madaniyatini shakllantirishda guruhli ishlar interaktiv metod sifatida faol qo‘llaniladi. Bu jarayonda yoshlar bir-birlari bilan muloqot qilib, axborotni birgalikda tahlil qiladilar va uni turli jihatlardan o‘rganadilar. Masalan, guruhdagi yoshlar turli mavzular bo‘yicha axborotni qidirib topish, uni tahlil

qilish va natijalarni birga muhokama qilish orqali axborot madaniyatini rivojlantiradilar.

5. **Ta’limda loyiha yondoshuvi**: axborot madaniyatini shakllantirish uchun loyiha metodlaridan foydalanish ham juda samarali hisoblanadi. Bu metod yoshlarni mustaqil axborot qidirish, uni tahlil qilish va yangicha loyihalar yaratishga undaydi. Loyihalar ustida ishlash jarayonida yoshlar axborotni faol qabul qiladilar, turli manbalardan foydalanib, ularni tahlil qiladilar va o‘z loyihalarini yaratishda undan samarali foydalanadilar.

Zamonaviy ta’lim jarayonida axborot texnologiyalari axborot madaniyatini rivojlantirishning muhim vositalaridan biri hisoblanadi. Axborot texnologiyalari yoshlarga axborotni tez va samarali izlash, uni tahlil qilish va qayta ishlash imkoniyatini beradi. Axborot madaniyatini rivojlantirishda axborot texnologiyalaridan foydalanishda, bizningcha, quyidagi jihatlarga e’tbor qaratish maqsadga muvofiq:

1. **Internet va elektron manbalardan foydalanish**: internet turli axborot manbalariga kirish imkoniyatini berib, yoshlarning axborotni topish va tahlil qilish qobiliyatini oshiradi. Turli elektron manbalar, bilim platformalari va internetdagi ma’lumotlar yoshlar uchun keng imkoniyatlar yaratadi. Bu jarayonda yoshlar axborotni faol izlashlari, ularning mazmunini qiyoslashlari va turli manbalardan kelgan ma’lumotlarni tahlil qilishlari mumkin.

2. **Axborot xavfsizligi va shaxsiy ma’lumotlarni himoya qilish**: axborot texnologiyalari orqali axborot xavfsizligi masalasi ham muhim o‘rin tutadi. Axborot madaniyatini shakllantirish jarayonida yoshlar shaxsiy ma’lumotlarni himoya qilish, internet xavfsizligi qoidalariga rioya qilish va zararli manbalardan qochishni o‘rganishlari zarur. Axborot xavfsizligini ta’minlash yoshlarning axborot texnologiyalari bilan ishlashdagi muhim ko‘nikmalaridan biridir.

3. **Onlayn ta’lim platformalaridan foydalanish**: axborot madaniyatini rivojlantirishda onlayn ta’lim platformalari yoshlarga o‘z bilimlarini mustaqil ravishda oshirish imkoniyatini beradi. Turli platformalar orqali yoshlar axborotni izlash, mustaqil loyihalar ustida ishlash va ma’lumotlarni tahlil qilish qobiliyatini rivojlantiradilar. Masalan, Coursera, Khan Academy va boshqa ta’lim platformalari yoshlarga keng bilim manbalaridan foydalanish imkoniyatini beradi.

4. **Dasturiy ta’minot va axborot tahlili vositalari**: axborot madaniyatini rivojlantirishda turli dasturiy ta’minotlar va axborot tahlili vositalari yoshlarga axborotni chuqurroq tahlil qilishda yordam beradi. Masalan, Excel, Power BI, Google Analytics kabi vositalar axborotni qayta ishlash va tahlil qilishda keng foydalaniladi. Yoshlar bu vositalardan foydalanib axborotni

qayta ishlaydilar, uni tahlil qiladilar va to‘g‘ri xulosalar chiqarishni o‘rganadilar [5].

Axborot madaniyatini rivojlantirishga qaratilgan pedagogik yondashuvlar va axborot texnologiyalari yoshlarning axborot bilan ishlash ko‘nikmalarini oshirishda muhim rol o‘ynaydi. Interaktiv metodlar, tanqidiy fikrlashni rivojlantiruvchi mashqlar va axborot texnologiyalaridan samarali foydalanish yoshlarga axborotni to‘g‘ri qabul qilish, tahlil qilish va uni ishonchli manbalardan foydalanish ko‘nikmalarini shakllantirishga yordam beradi. Axborot madaniyati yoshlarni axborot jamiyatida muvaffaqiyatli faoliyat yuritishga tayyorlab, ularning tanqidiy fikrlash va axborot xavfsizligiga rioya qilish qobiliyatini kuchaytiradi.

O‘quvchilarda axborot bilan ishlash madaniyatini shakllantirish zamonaviy ta’lim jarayonining asosiy vazifalaridan biri hisoblanadi. Axborot oqimlarining shiddatli o‘sishi, yolg‘on axborotlar tarqalishi va globallashuv jarayoni yoshlarni axborotni to‘g‘ri qabul qilish, tahlil qilish va uni tanqidiy baholashga yo‘naltirish zaruratini kuchaytirmoqda. Axborot madaniyati yoshlarni yolg‘on ma’lumotlardan himoya qilish, axborot xavfsizligiga rioya qilish va shaxsiy ma’lumotlarni himoya qilishga yordam beradi. Shuningdek, axborot madaniyati ularni global axborot jamiyatida to‘g‘ri yo‘naltirib, tanqidiy fikrlovchi va axborotdan samarali foydalanuvchi shaxslarga aylantiradi.

Xulosa

Axborot tushunchasi ta’lim jarayonidagi markaziy tushunchalardan biri bo‘lib, uni to‘g‘ri tushunib, faoliyatda maqsadga muvofiq qo‘llash pedagogik mazmunning asosini tashkil qiladi. Axborotni to‘g‘ri qabul qilish, tahlil qilish va qayta ishlash o‘quvchilarning ta’limdagi muvaffaqiyatini ta’minlaydi. Bu jarayon yoshlarning intellektual rivojlanishiga katta ta’sir ko‘rsatadi. Axborot madaniyatini shakllantirish masalasi pedagogika sohasida keng o‘rganilgan. Pedagogik tadqiqotlardan kelib chiqqan holda, axborot madaniyatini rivojlantirishda axborot texnologiyalaridan foydalanish va tanqidiy fikrlash ko‘nikmalarini rivojlantirish zarurligi ta’kidlanadi. Shuningdek, milliy va xalqaro metodlarni uyg‘unlashtirish ushbu jarayonda samaradorlikni oshiradi. Globallashuv davrida axborot bilan ishlash ko‘nikmalari yoshlar uchun muhim ahamiyatga ega. Axborot oqimlari kengayib, yolg‘on ma’lumotlar tarqalishi kuchayib borayotgani sababli, o‘quvchilarda axborotni tanqidiy qabul qilish va tahlil qilish qobiliyatini rivojlantirish zarur. Bu jarayon yoshlarni axborot xavflaridan himoya qiladi va ularni to‘g‘ri qaror qabul qilishga tayyorlaydi. Pedagogik yondashuvlar yordamida axborot madaniyatini shakllantirish interaktiv metodlar va axborot texnologiyalaridan foydalanish orqali amalga oshiriladi. Tanqidiy fikrlashni rivojlantiruvchi topshiriqlar, media savodxonlik darslari va guruhli ishlar

yoshlarni axborot bilan to‘g‘ri ishlashga o‘rgatadi. Axborot xavfsizligi axborot madaniyatining muhim qismi bo‘lib, yoshlarning shaxsiy ma’lumotlarini himoya qilish va axborot xavflariga qarshi kurashishga yo‘naltirilgan. Axborot madaniyati shakllangan yoshlar shaxsiy ma’lumotlarni himoya qilish qoidalariga amal qiladilar va axborot xavfsizligiga rioya qiladilar.

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NEYROPEDAGOGIK TEXNOLOGIYALAR ORQALI O‘QUVCHILARDA ZAMONAVIY KITOBXONLIK MADANIYATINI RIVOJLANTIRISH

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ANNOTATSIYA

Mazkur maqolada o‘quvchilarda kitobxonlik madaniyatini rivojlantirishda neyropedagogik texnologiyalardan foydalanishning ahamiyati va samaradorligi tahlil qilinadi. Kitobxonlik madaniyati, insonning bilimga va ma’naviy rivojlanishga bo‘lgan intilishi sifatida qaralib, bu jarayonda neyropedagogik texnologiyalarning qo‘llanilishi ta’limda individual yondashuv, xotira va diqqatni oshirish kabi omillarga asoslangani ta’kidlanadi. Maqolada neyropedagogik yondashuvlar yordamida kitobxonlik madaniyatini rivojlantirish uchun vizual va audio yordamchi vositalar, interaktiv muhokamalar, audio kitoblar, va tanqidiy fikrlash kabi usullar tavsiya etilgan. Natijada, kitobxonlik madaniyati o‘quvchilarning intellektual va ma’naviy rivojlanishiga ijobiy ta’sir ko‘rsatadi.

Kalit so‘zlar: kitobxonlik madaniyati, neyropedagogika, kognitiv rivojlanish, ta’lim texnologiyalari, tanqidiy fikrlash, xotira, interaktiv ta’lim.

РАЗВИТИЕ СОВРЕМЕННОЙ КУЛЬТУРЫ ЧТЕНИЯ У УЧАЩИХСЯ С ПОМОЩЬЮ НЕЙРОПЕДАГОГИЧЕСКИХ ТЕХНОЛОГИЙ

АННОТАЦИЯ

В данной статье анализируется значимость и эффективность использования нейропедагогических технологий для развития культуры чтения у учащихся. Культура чтения рассматривается как стремление человека к знаниям и духовному развитию, и подчеркивается, что применение нейропедагогических технологий в этом процессе основано на таких факторах, как индивидуальный подход в обучении, улучшение памяти и внимания. В статье рекомендуется использовать такие методы, как визуальные и аудиоподдерживающие средства, интерактивные обсуждения, аудиокниги и развитие критического мышления для продвижения культуры чтения с помощью нейропедагогических подходов. В результате культура чтения оказывает положительное влияние на интеллектуальное и духовное развитие учащихся.

Ключевые слова: культура чтения, нейропедагогика, когнитивное развитие, образовательные технологии, критическое мышление, память, интерактивное обучение.

DEVELOPING A MODERN READING CULTURE IN STUDENTS THROUGH NEUROPEDAGOGICAL TECHNOLOGIES

ABSTRACT

This article analyzes the significance and effectiveness of using neuropedagogical technologies to foster a culture of reading in students. A culture of reading is viewed as an individual's pursuit of knowledge and spiritual growth, and it is emphasized that applying neuropedagogical technologies in this process is based on factors such as personalized learning approaches, enhancing memory, and increasing attention. The article recommends methods such as visual and audio support tools, interactive discussions, audiobooks, and critical thinking development as strategies for promoting a culture of reading through neuropedagogical approaches. As a result, a culture of reading positively impacts the intellectual and spiritual development of students.

Keywords: reading culture, neuropedagogy, cognitive development, educational technologies, critical thinking, memory, interactive education.

KIRISH

Kitobxonlik madaniyati insonning bilimga intilishi, kitob o‘qish orqali ma’naviy va intellektual rivojlanishga erishishi, fikrlash qobiliyatini oshirish bilan bog‘liq bo‘lgan mos ko‘nikmalar va odatlar tizimini anglatadi. Kitobxonlik madaniyati nafaqat kitoblarni o‘qish, balki ularni to‘g‘ri tushunish, tahlil qilish, tanqidiy fikr yuritish va o‘qilgan kitobning mazmunini hayotda qo‘llay bilishni ham o‘z ichiga oladi. Zamonaviy jamiyatda bu madaniyat juda muhim, chunki kitobxonlik orqali inson nafaqat bilim oladi, balki turli sohalardagi axborotlarni tushunadi, o‘zining shaxsiy pozitsiyasini shakllantiradi va jamiyatda bilimli, tanqidiy fikrlovchi shaxs sifatida namoyon bo‘ladi.

Axborot texnologiyalari rivojlanayotgan sharoitda, ko‘plab insonlar axborotni tezkor qabul qilish imkoniyatiga ega bo‘lsa ham, kitobxonlik madaniyati ularda yetarli darajada shakllanmagan. Kitob o‘qish va uni tushunish jarayoni miyaning chuqurroq fikr yuritishga qodir bo‘lgan imkoniyatlarini ishga soladi, bu esa shaxsning ma’naviy rivojlanishiga, fikrlashni tartibga solishga va o‘ziga xos shaxsiy qiymatlarini shakllantirishga xizmat qiladi. [1; 45] Shu sababli, kitobxonlik madaniyati nafaqat shaxsiy rivojlanish uchun, balki jamiyatda bilimli va madaniyatli shaxslarni tarbiyalash uchun ham muhimdir.

Neyropedagogik texnologiyalar orqali o‘quvchilarda kitob o‘qish jarayoniga to‘g‘ri yondashuv va fikr yuritish qoidashlarini shakllantirish mumkin. Bunda kitoblardan olingan ma’lumotlar o‘quvchilarning uzoq muddatli xotirasida saqlanishi, tushunish va anglash

jarayonida chuqurroq qabul qilinishi ta’minlanadi. Shu bilan birga, neyropedagogik texnologiyalar ko‘makchi vositalar orqali vizual va audio axborotni qo‘shish, assotsiatsiyalarni rivojlantirish va o‘quv jarayonini yoqimliroq qilish imkoniyatini ham beradi. [2; 122]

Maqolaning maqsadi — kitobxonlik madaniyatini rivojlantirishda neyropedagogik texnologiyalarni qo‘llashning afzalliklarini o‘rganish va ularning o‘quvchilarda kitob o‘qishga bo‘lgan qiziqish va intellektual rivojlanishga ta’sirini tadqiq qilishdir. Shu asosda quyidagi vazifalar belgilanadi:

1. Kitobxonlik madaniyatining pedagogik va neyropsixologik jihatlarini o‘rganish;

2. Neyropedagogik texnologiyalarni kitobxonlik madaniyatini rivojlantirishda qo‘llash usullarini tahlil qilish;

3. O‘quvchilarda kitobxonlikka bo‘lgan qiziqish va axborotni qayta ishlash qobiliyatini oshirish uchun neyropedagogik usullarning natijadorligini baholash;

4. Neyropedagogik texnologiyalarni kitobxonlik madaniyatini rivojlantirishda samarali qo‘llash bo‘yicha tavsiyalar ishlab chiqish.

Shunday qilib, mazkur maqola kitobxonlik madaniyatini shakllantirishda neyropedagogik texnologiyalardan foydalanishning nazariy va amaliy asoslarini yoritishga qaratilgan.

METODOLOGIK ASOS

Maqola uchun metodologik asos bo‘lgan tadqiqotlar quyidagi olimlar tomonidan amalga oshirilgan. Ular kitobxonlik madaniyatini rivojlantirish, neyropedagogika va kognitiv psixologiya sohalaridagi tadqiqotlari orqali ushbu mavzuda ilmiy asoslar yaratgan.

L.S.Vigotskiyning "yaqin rivojlanish zonasi" konsepsiyasi ta’limda shaxsga individual yondashuvni ishlab chiqishda muhim o‘rin tutadi. U kognitiv rivojlanish jarayonida ijtimoiy o‘zaro aloqalarning ahamiyatini yoritadi, bu esa kitobxonlik madaniyatini shakllantirishda qo‘llaniladigan neyropedagogik texnologiyalarga asos bo‘ladi. [1] Jan Piaje bolalarda kognitiv rivojlanish jarayonini tushuntirib, o‘quvchilarning bilimni turli bosqichlarda o‘zlashtirish xususiyatlarini o‘rganadi. Uning ishi kitobxonlik madaniyatini rivojlantirishda yoshga mos metodlarni ishlab chiqishda qo‘llaniladi. [2] D.O.Xebbning "Hujayra aloqalari" nazariyasi neyronlar orasidagi bog‘lanishlarning mustahkamlanishi orqali bilimlarni uzoq muddatli xotirada saqlash jarayonini tushuntiradi. Ushbu nazariya kitobxonlik madaniyatini mustahkamlash uchun xotira mashqlari ishlab chiqishda muhim ahamiyatga ega. [3] G.Gardnerning "ko‘p intellektlar nazariyasi" insonning har xil bilim olish qobiliyatlariga e’tibor qaratishni

talab etadi. Uning ishi kitobxonlikni rivojlantirishda individuallikni hisobga oluvchi neyropedagogik texnologiyalarni ishlab chiqishga asos bo‘ladi. [4] M.Spitser neyrobiologiya va ta’limning o‘zaro bog‘liqligi haqida yoritgan. Uning tadqiqotlari kitobxonlik madaniyatiga ta’sir etuvchi neyrofiziologik jarayonlarni tushunishga yordam beradi. [5] N.Z.Alimova axborot va media savodxonlikni rivojlantirish bo‘yicha tadqiqotlari orqali o‘quvchilarda axborotni tanqidiy tushunish va qabul qilish qobiliyatini oshirish usullarini ishlab chiqadi. [6] M.A.Turdiyev axborot xavfsizligi va axborot savodxonligini shakllantirish bo‘yicha ish olib boradi. Uning ishi kitobxonlik madaniyatini rivojlantirishda tanqidiy tahlil va axborot xavfsizligini ta’minlashning ahamiyatini tushuntiradi. [7] Z.I.Karimova ta’limda kognitiv rivojlanish va shaxsga moslashtirilgan metodlarni ishlab chiqish bo‘yicha izlanishlari orqali kitobxonlik madaniyatini rivojlantirishda shaxsiy kognitiv xususiyatlarni hisobga olishga asoslangan yondashuvlarni ishlab chiqadi. [8]

Tadqiqotda adekvat holatda o‘rganishni ta’minlashga qaratilgan nazariy (qiyosiy-taqqoslash, modellashtirish, tahliliy-sintetik), diagnostik (so‘rovlar, test, kuzatish, suhbat), prognostik (ekspert baholash, mustaqil baholarni umumlashtirish), pedagogik eksperiment va matematik (ma’lumotlarni statistik qayta ishlash, natijalarni grafik tasvirlash) metodlar majmuidan foydalanildi.

TADQIQOT NATIJALARI

Neyropedagogik texnologiyalar va ularning ta’lim jarayonidagi afzalliklari. Neyropedagogik texnologiyalar — bu ta’lim jarayonida inson miyasining kognitiv va neyrofiziologik xususiyatlarini hisobga olishga asoslangan yondashuvlardir. Neyropedagogik usullar orqali o‘quv jarayonida individuallikni hisobga olish, vizual va audio vositalardan foydalanish, diqqat va xotirani kuchaytirish, o‘zlashtirish jarayonini yoqimli va qiziqarli qilish kabi afzalliklar ta’minlanadi. [6;89] Bu yondashuvlar kitobxonlik madaniyatini rivojlantirishda ham o‘ta muhimdir, chunki ular orqali o‘quvchilarda kitobga nisbatan qiziqish uyg‘otish, kitob mazmunini yaxshiroq tushunish va uzoq muddatli xotirada saqlash imkoniyati yaratiladi.

Kitob o‘qish jarayonida miya faoliyati va kognitiv jarayonlarning ahamiyati. Kitob o‘qish jarayonida inson miyasida bir necha kognitiv jarayonlar ishga tushadi, jumladan, diqqatni jamlash, vizual va audio ma’lumotlarni qayta ishlash, assotsiatsiyalarni shakllantirish, xotirada saqlash va tanqidiy mulohaza yuritish kabi faoliyatlar amalga oshadi.

Kitob o‘qish jarayonida miya faoliyati to‘g‘risidagi tadqiqotlardan ma’lum bo‘lishicha, matn o‘qish jarayonida turli zonalar faol bo‘lib, kitobdagi ma’lumotlarni tushunish va

anglashda muhim o‘rin tutadi. Neyrobiolog M.Spitser ta’kidlaganidek, “Kitob o‘qish jarayoni inson miyasining chuqur fikrlash qobiliyatini ishga tushiradi va ushbu jarayon insonning umumiy intellektual darajasini oshirishga xizmat qiladi” [5; 163] Shuningdek, vizual va audio ma’lumotlarni birgalikda qabul qilish natijasida xotirada uzoqroq muddat saqlanadi.

Neyropedagogik yondashuvlar orqali kitobxonlik madaniyatini rivojlantirishning nazariy asoslari. Neyropedagogik yondashuvlar kitobxonlik madaniyatini rivojlantirishda o‘quvchilarning shaxsiy kognitiv xususiyatlarini hisobga olishga qaratilgan. Bunda o‘quvchilarning diqqatni jamlash qobiliyati, xotirada ma’lumotni saqlash va mulohaza qilish qobiliyatlari rivojlantiriladi. Vigotskiyning ta’limotida ta’kidlanganidek, “shaxsning rivojlanishi uning yaqin rivojlanish zonasiga muvofiq amalga oshirilishi zarur” (Vigotskiy, 1982). Shu asosda, neyropedagogik texnologiyalar orqali o‘quv jarayonini individuallashtirish va o‘quvchining rivojlanish ehtiyojlariga moslashtirish mumkin.

Kitobxonlik madaniyatini shakllantirishda tanqidiy fikrlash va axborotni tahlil qilish kabi muhim ko‘nikmalarni ham neyropedagogika yordamida rivojlantirish mumkin.

TADQIQOT NATIJALARI

Kitobxonlik madaniyatini shakllantirishda neyropedagogik texnologiyalardan foydalanish usullari.

1. Vizual va audio yordamchi vositalardan foydalanish orqali kitobga qiziqishni oshirish. Kitobxonlik madaniyatini shakllantirishda vizual va audio yordamchi vositalardan foydalanish o‘quvchilarda kitobga qiziqish uyg‘otadi va matnni yaxshiroq tushunishga yordam beradi. Zamonaviy neyropedagogik texnologiyalar turli xil vizual va audio vositalar orqali ma’lumotni qabul qilish jarayonini yoqimli va qiziqarli qiladi.

• **Videolavhalar va illustratsiyalar qo‘shish:** Kitobdagi syujetni yoki tushunchalarni to‘liqroq tushunish uchun videolavhalar yoki rasmlar qo‘shish mumkin. Bu yordamchi vositalar orqali o‘quvchilar kitob mazmuniga qiziqish uyg‘otadi va o‘qish jarayonini osonroq qabul qiladi.

• **Audio kitoblardan foydalanish:** Ovozli kitoblar matnni qabul qilishda sezilarli yordam beradi, ayniqsa vizual axborotni qabul qilishda qiyinchilikka duch keluvchi o‘quvchilar uchun. Ovozli kitoblar orqali o‘quvchilar kitobni quloq orqali eshitishlari mumkin, bu esa matnni yaxshiroq tushunishga va xotirada saqlashga yordam beradi.

• **Qisqa vizual va audio hikoyalar:** Asar mazmunini qisqacha vizual va audio tarzda bayon qilish o‘quvchilarga

kitobning asosiy g‘oyalarini tushunish va qiziqish uyg‘otish uchun yaxshi usuldir. Masalan, kitob bosh qahramonlari yoki muhim voqealarni to‘g‘ridan to‘g‘ri tasvirlaydigan qisqa videolar yoki animatsiyalar ishlatish mumkin. [3; 71]

2. Xotirani mustahkamlash va diqqatni jamlashga yordam beruvchi kognitiv mashqlar. Kognitiv mashqlar xotira va diqqatni mustahkamlash uchun muhimdir. Kitob o‘qish jarayonida ushbu mashqlar o‘quvchilarning diqqatni uzoq muddat jamlab, mazmunli o‘qishni ta’minlaydi, matnni xotirada uzoq muddat saqlashga yordam beradi.

• **Fokus va diqqatni jamlash mashqlari:** Matnni o‘qishda diqqatni jamlashni o‘rgatish uchun maxsus mashqlar tavsiya etiladi. Masalan, "aqliy nuqta" mashqi (fikrni bir nuqtada jamlash) yoki har bir bo‘limdan so‘ng qisqa tanaffuslar qilish orqali o‘quvchilarning diqqatini tiklashga yordam beradi.

• **Qisqa muddatli yodlash mashg‘ulotlari:** Kitobdagi ma’lumotlarni tez yodlashga yo‘naltirilgan qisqa muddatli yodlash mashqlari o‘quvchilarning xotirasini mustahkamlaydi. Buning uchun, o‘quvchilarga asarning muhim fikrlarini takrorlash, asosiy nuqtalarni qayta yozish yoki vizual diagrammalar tuzish tavsiya etiladi.

• **Xotirani rivojlantiruvchi ma’no yodlash texnikasi:** Matnni yodlashda o‘quvchilar ma’noni qayta ishlab, tushunchalarga bog‘liq assotsiatsiyalar orqali xotirada saqlashlarini o‘rganishadi. Masalan, biror ma’lumotni o‘z hayotlari bilan bog‘lash yoki voqeani tasavvurda aniq ssenariy sifatida tasvirlash xotirani mustahkamlashga yordam beradi. [7; 52]

3**. Assotsiatsiyalar va vizuallashtirish orqali kitob mazmunini yaxshiroq tushunish usullari.** Assotsiatsiyalar va vizuallashtirish orqali matnni yaxshiroq tushunish, o‘quvchilarda kitob mazmunini tanqidiy tahlil qilish va eslab qolish qobiliyatini rivojlantiradi. Bu neyropedagogik metodlar ko‘makchi vositalar orqali o‘quv jarayonida asarning ma’nosini chuqurroq anglashga yordam beradi.

• **Assotsiatsiyalar tuzish mashg‘ulotlari:** O‘quvchilarda kitob mazmuniga oid assotsiatsiyalarni rivojlantirish ularning tushunish jarayonini chuqurlashtiradi. Bunda kitobdagi personajlar yoki voqealarni shaxsiy tajribalari bilan bog‘lash orqali o‘quvchilar asar mazmunini o‘zlari uchun ahamiyatli qilib qabul qiladilar.

• **Vizual diagrammalar va maynd-maplar:** Matn mazmunini vizuallashtirish orqali tushunishni yaxshilashga ko‘mak beradi. Maynd-maplar, sxemalar va diagrammalar yordamida kitobning asosiy g‘oyalari, personajlar munosabatlari yoki hodisalar orasidagi bog‘liqliklarni tushunishga yordam beradi.

• **Mazmunli simulyatsiyalar va tasavvuriy sayohatlar:** O‘quvchilar kitob mazmunini tasavvur orqali yanada yaxshi o‘zlashtirishlari uchun simulyatsiyalar yoki "tasavvuriy sayohatlar" mashqlaridan foydalanish mumkin. Masalan, o‘quvchilar asarning muhim

epizodlarini yoki qahramonlarni tasavvurda kuzatishlari orqali ma’lumotlarni to‘liq qabul qiladilar.

Amaliy neyropedagogik usullar orqali kitobxonlik madaniyatini rivojlantirish.

1. **Elektron kitoblar va interaktiv kitobxonlik platformalaridan foydalanish.** Zamonaviy elektron kitoblar va interaktiv kitobxonlik platformalari o‘quvchilarda kitob o‘qishga bo‘lgan qiziqishni oshirish va kitobxonlik madaniyatini shakllantirishda katta ahamiyatga ega. Elektron kitoblar va interaktiv platformalar kitob o‘qish jarayonini jonli va samarali qilishga yordam beradi.

• **Elektron kitoblarning afzalliklari:** Elektron kitoblar o‘quvchilarga istalgan vaqtda va istalgan joyda kitob o‘qish imkonini beradi. Bu ularga kitob o‘qish odatini rivojlantirishda yordam beradi. Shu bilan birga, elektron kitoblarda yorqin illustratsiyalar, foydali qo‘shimchalar va interaktiv elementlar mavjud bo‘lishi mumkin, bu esa o‘quvchilarning qiziqishini oshiradi.

• **Interaktiv kitobxonlik platformalari:** Bugungi kunda turli interaktiv kitobxonlik platformalari mavjud bo‘lib, ular o‘quvchilarga kitoblarni birgalikda o‘qish va muhokama qilish imkonini beradi. Masalan, onlayn kitob klublari, kitob bilan bog‘liq savol-javoblar, mazmunni chuqurroq o‘rganish uchun testlar va topshiriqlar kabi interaktiv elementlar yordamida o‘quvchilar o‘qish jarayonida faol ishtirok etadilar. Bu usullar orqali o‘quvchilarda kitobga nisbatan qiziqish va tanqidiy qarash rivojlanadi. [4; 76]

2. Ovozli kitoblar va podkastlar yordamida kitobxonlik ko‘nikmasini shakllantirish. Ovozli kitoblar va podkastlar o‘quvchilarda kitobxonlik ko‘nikmalarini shakllantirishda muhim ahamiyat kasb etadi. Ular kitob o‘qishga vaqt yo‘qotmasdan ma’lumot qabul qilish imkonini beradi va audio ma’lumotni yaxshi qabul qiladigan o‘quvchilar uchun foydali hisoblanadi.

• **Ovozli kitoblar:** Ovozli kitoblar, xususan, yosh o‘quvchilar yoki vizual axborotni qabul qilishda qiyinchilikka duch keluvchilar uchun juda foydali. Ular kitob mazmunini quloq orqali qabul qilish orqali to‘liq tushunishlari mumkin. Shuningdek, ovozli kitoblarni eshitish orqali tasavvur qila olish va matnni anglash qobiliyatlari rivojlanadi. Bu usul o‘quvchilarga diqqat jamlash va xotirani rivojlantirishga yordam beradi.

• **Podkastlar:** Podkastlar kitob muhokamasi yoki o‘quvchilarning qiziqishlariga mos ma’lumotlarni tinglash uchun qo‘llanilishi mumkin. Podkastlar orqali ular yangi kitoblar haqida bilib olishlari, shuningdek, mashhur asarlar yoki yangi kitoblarni muhokama qilishlari mumkin. Bu yordamchi vosita o‘quvchilarda kitobga qiziqish uyg‘otib, ularni kengroq o‘qishga rag‘batlantiradi.

3. **Muhokama va bahslar orqali o‘quvchilarda kitobxonlikka qiziqish uyg‘otish.** Muhokama va bahslar orqali o‘quvchilarda kitobga bo‘lgan qiziqishni oshirish va tanqidiy fikrlash ko‘nikmalarini rivojlantirish mumkin. Bunday jarayonlar o‘quvchilarni faol ishtirokchiga aylantiradi, ularda fikr bildirish va mulohaza qilish istagini uyg‘otadi.

• **Kitob muhokamalari:** Oliy o‘quv yurtlari yoki maktablar darajasida kitob muhokamalari tashkil etish orqali o‘quvchilar o‘qilgan kitobning mazmunini chuqurroq tushunish va uning asosiy g‘oyalarini anglashga harakat qiladilar. Bunday muhokamalar o‘quvchilarga kitob haqidagi fikrlarini bayon qilish, o‘z tushunchalarini boshqalar bilan bo‘lishish imkonini beradi.

• **Bahslar va savol-javob mashg‘ulotlari:** Kitob bo‘yicha bahslar va savol-javob sessiyalari o‘quvchilarda kitobdagi ma’lumotlarga nisbatan qiziqish uyg‘otadi. Masalan, kitobning bosh qahramoni yoki muhim voqealar haqida bahs yuritish orqali o‘quvchilar asar mazmuniga chuqurroq kirishadi va turli nuqtayi nazarlardan qarashni o‘rganadilar. Savol-javob mashg‘ulotlari orqali esa o‘quvchilar asarning murakkab qirralarini o‘rganishga harakat qiladilar.

• **Interaktiv kitobxonlik sessiyalari:** Turli guruhlarda onlayn yoki oflayn formatda o‘tkazilgan interaktiv sessiyalar kitob o‘qish jarayonini ijtimoiy va qiziqarli qiladi. Masalan, kitobning boshqa o‘quvchilarga tasavvurga asoslangan vizual taqdimotlar yoki qisqacha namoyishlar ko‘rinishida taqdim qilinishini tashkil etish mumkin. Bu orqali o‘quvchilar kitobni o‘qish jarayonida faol ishtirok etib, o‘z qiziqishlarini yanada oshiradilar.

Shunday qilib, elektron va audio vositalar, shuningdek, interaktiv muhokamalar kitobxonlik madaniyatini rivojlantirishda samarali amaliyotlardir. Ular orqali o‘quvchilarda kitobga qiziqish uyg‘otish, mulohaza va tahlil qilish qobiliyatlarini rivojlantirish va ularda uzoq muddatli kitobxonlik madaniyatini shakllantirish mumkin.

XULOSA

Neyropedagogik texnologiyalar kitobxonlik madaniyatini shakllantirishda o‘quvchilarning intellektual va ma’naviy rivojlanishiga katta ta’sir ko‘rsatadi. Ushbu texnologiyalar orqali o‘quv jarayoni o‘quvchilarning individual kognitiv xususiyatlarini hisobga olgan holda tashkil etiladi, bu esa kitob o‘qish jarayonini qiziqarli va samarali qiladi. Vizual va audio yordamchi vositalar, interaktiv platformalar va muhokama sessiyalari o‘quvchilarning diqqatini oshirish, xotirani mustahkamlash va kitobga bo‘lgan qiziqishini uyg‘otishda samarali vositalar hisoblanadi. Shu bilan birga, neyropedagogik

texnologiyalar tanqidiy fikrlash, tahlil qilish va axborotni to‘g‘ri qabul qilish ko‘nikmalarini rivojlantirishga yordam beradi.

Neyropedagogik texnologiyalardan foydalanish o‘quvchilarning umumiy bilim va madaniyatiga ijobiy ta’sir ko‘rsatadi. Ular orqali o‘quvchilar turli xil axborot manbalarini tanqidiy baholash, ma’naviy qadriyatlarni tushunish va madaniyatli mulohaza qilish kabi muhim ko‘nikmalarga ega bo‘ladilar. Kitobxonlik madaniyati orqali shakllangan bilimlar va ko‘nikmalar jamiyatda mas’uliyatli va bilimli fuqarolarni tarbiyalashga xizmat qiladi.

Neyropedagogik texnologiyalarni ta’limda keng qo‘llash bo‘yicha tavsiyalar:

1. **Ta’lim muassasalarida elektron va interaktiv kitobxonlik platformalarini joriy etish:** Elektron va interaktiv vositalardan keng foydalanish orqali o‘quvchilarning kitobxonlik madaniyati va axborotni qabul qilish qobiliyatlarini rivojlantirish mumkin.

2. **Audio kitoblar va podkastlarning qo‘llanilishini rag‘batlantirish:** Kitobxonlikni rivojlantirishda audio vositalardan foydalanish vizual axborotni qabul qilishda qiyinchilikka duch keluvchi o‘quvchilar uchun foydali. Bu usul ularning kitobxonlik madaniyatiga nisbatan qiziqishini uyg‘otadi.

3. **Kitob muhokamalari va interaktiv sessiyalar tashkil etish:** Kitobxonlikni rivojlantirish uchun muntazam ravishda kitob muhokamalari, bahslar va savol-javob sessiyalari tashkil etish orqali o‘quvchilarni o‘quv jarayoniga faol jalb qilish mumkin. Bu usul o‘quvchilarning tanqidiy fikrlashini rivojlantirishga yordam beradi.

4. **Mazmunni chuqurroq tushunish uchun vizual va audio yordamchilarni ta’lim jarayoniga kiritish:** Vizual va audio materiallardan foydalanib o‘quvchilarning diqqat jamlash, xotirada saqlash va mazmunli tushunish qobiliyatlarini rivojlantirish tavsiya etiladi.

Umuman, neyropedagogik texnologiyalarni keng qo‘llash orqali o‘quvchilarda kitobxonlik madaniyatini shakllantirish va ularning umumiy bilim saviyasini oshirishga erishish mumkin. Bu jarayon o‘quvchilarni madaniyatli, bilimli va mas’uliyatli shaxslar sifatida tayyorlashga xizmat qiladi.

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COMPARATIVE STUDY OF NEOLOGISM IN ENGLISH AND FRENCH FOR SPORT

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ABSTRACT

This comparative study investigates the creation and usage of neologisms in the English and French languages within the realm of sports. Neologisms, which are newly invented words or phrases, play an essential role in mirroring cultural changes, technological progress, and globalization in the sports arena.

Keywords: Sportification, fanfluence, tie-break in tennis, terminology ,VAR (Video Assistant Referee) freestyle, motorsports.

INTRODUCTION

The research examines how neologisms come into being, develop, and are embraced in both English and French, with a focus on their morphological, semantic, and syntactic characteristics. By analyzing common word formation patterns-such as borrowing, compounding, blending, and affixation-in both languages, the study reveals the similarities and differences in linguistic innovation. It also looks at the impact of English as a global lingua franca on sports terminology and its influence on French, alongside the efforts of French language authorities to maintain linguistic integrity. Through this analysis, the study seeks to enhance the understanding of the dynamic relationship between language, culture, and sports.

MAIN PART

A neologism is a newly created word, phrase, or term that is starting to gain popularity but hasn't been fully embraced by mainstream language yet. These new terms arise from shifts in culture, technology, science, or social trends, and they often illustrate the evolving character of language.

Sports Neologisms in English

In English, new sports terms are frequently formed through various methods:

1. Borrowing: English often adopts terms from other languages, particularly French, for sports vocabulary. Examples include "rendezvous" (a meeting place) in Formula 1 and "grand prix" (which means "big prize") in motorsports.

2. Compounding: This involves merging two existing words to create new ideas, such as "goalkeeper," "track-and-field," or "freestyle" in swimming.

3. Acronyms and Abbreviations: These are widely used in sports, such as "VAR" (Video Assistant Referee) in football and "MVP" (Most Valuable Player) across various sports.

4. Brand Influence: Sports brands and media contribute to the popularization of terms, such as *"nikefication,"* which refers to the impact of Nike on sports culture.

The development of sports vocabulary in the English language represents a dynamic phenomenon influenced by a range of linguistic strategies, such as lexical borrowing from other languages, compounding, and the formation of acronyms. Additionally, the impact of brands and media plays a significant role in enriching this specialized lexicon, thereby illustrating the intricate relationship between language and cultural practices within the realm of sports. As new trends and innovations arise, the terminology will inevitably evolve, mirroring the constantly shifting landscape of athletic competition and its global relevance. This continuous evolution not only facilitates improved communication among fans and athletes but also highlights the broader cultural implications of sports within society.

Sports Neologisms in French

The French language, which prioritizes linguistic purity particularly through the efforts of institutions like the *Academie française* takes different approaches to the incorporation and creation of neologisms:

1.Gallicization: Foreign sports terms, especially those from English, are modified to align with French phonetics and structure. For instance, "football" is often shortened to "le foot" in informal contexts, and "le jogging" is commonly used to refer to running.

2. Creation of New Terms: French authorities sometimes opt to invent new words rather than borrow existing ones. For example, "*courriel*" was developed as a substitute for the English term "email," and similar initiatives have been seen in sports, such as "*jeu décisif*," which replaces the English term "tie-break." French authorities occasionally choose to invent new words rather than adopt foreign ones. For instance, the term *courriel* was developed to substitute the English word email, and similar initiatives are evident in sports terminology. The phrase *jeu décisif* is used in place of the English term tie-break in tennis. Certain phrases are translated directly from English into French. An example of this is temps additional, which refers to added time in football.

The development of sports terminology in the French language exemplifies not only linguistic flexibility but also the continual negotiation between the acceptance of global influences and the preservation of cultural uniqueness. As sports evolve and new trends emerge, it will be pertinent to examine how these strategies adapt and which new terms will be introduced into the French lexicon.

The Impact of Culture on the Creation of Neologisms

English: The widespread influence of English in sports media, such as ESPN and Sky Sports, along with its extensive use for global communication, has resulted in a rapid incorporation of English sports terminology. For example, words like dribble, offside, and penalty are commonly adopted into other languages, including French.

French: In France, there is a strong focus on maintaining the purity of the French language, which leads to greater resistance against English neologisms. The Commission *d'enrichissement de la langue française* frequently proposes French substitutes for English terms. Nevertheless, in the realm of sports, younger individuals tend to prefer English borrowings due to their international exposure, despite pushback from older generations and official bodies.

Both English and French depend significantly on sports media to promote new words. Social media, broadcasting, and commentaries present new terminology that mirrors current trends in sports. English terms often gain global traction, impacting French speakers who participate in international events such as the FIFA World Cup or the Olympics.

Challenges and Insights

English Prevalence: A significant number of new sports terminology comes from English, driven by the global spread of sports culture, especially in contemporary sports such as basketball, soccer, and e-sports.

Safeguarding the French Language: Although France actively develops new French vocabulary, the appeal and practicality of English terms often overshadow these efforts.

CONCLUSION

In conclusion, a comparative analysis of sports neologisms in English and French highlights significant differences in how each language adapts. English is more inclined to innovate rapidly, often prioritizing creativity over linguistic purity, while French shows greater resistance by developing its own terms to preserve its linguistic identity. Nonetheless, the influence of globalization and the prevalence of English in the sports arena have led to the

incorporation of many English terms into everyday French, despite their lack of official recognition.

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АСИМПТОТИЧЕСКОЕ РАЗЛОЖЕНИЕ ПЕРИОДИЧЕСКОГО РЕШЕНИЯ СИНГУЛЯРНО ВОЗМУЩЕННОЙ СИСТЕМЫ ГИПЕРБОЛИЧЕСКОГО ТИПА, СОДЕРЖАЩЕЙ СЛАБУЮ НЕЛИНЕЙНОСТЬ

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АННОТАЦИЯ

В статье рассматривается система дифференциальных уравнений в частных производных с малыми параметрами ε, μ при старших производных. При некоторых условиях на коэффициенты, доказано существование 2π-периодического по t решение и построено асимптотическое разложение решение задачи.

Ключевые слова: асимтотическое разложение, пограничные функции, малый параметр, остаточный член.

ABSTRACT

The article considers a system of partial differential equations with small parameters ε, μ at higher derivatives. Under certain conditions on the coefficients, the existence of a 2π-periodic solution in t is proved and an asymptotic expansion of the solution to the problem is constructed.

Keywords: asymptotic expansion, boundary conditions, small parameter

ВВЕДЕНИЕ

Целью исследования является развитие асимптотического метода пограничных функций для сингулярно-возмущенных систем уравнений имеющий слабую нелинейность [1]. Понятие асимптотического разложения функции и асимптотического ряда были введены Анри Пуанкаре при разрешении задач небесной механики. Отдельные случаи асимптотического разложения были открыты и применялись ещё в XVIII в. Асимптотические разложения и ряды играют важную роль в различных задачах математики, механики и физики.

Рассмотрим гиперболическую систему дифференциальных уравнений

$$\begin{cases} \varepsilon^2\mu^2\left(\dfrac{\partial^2 z}{\partial x^2}-\dfrac{\partial^2 z}{\partial t^2}\right)=\dfrac{\partial z}{\partial t}-y \\ \varepsilon^2\mu^2\left(\dfrac{\partial^2 y}{\partial x^2}-\dfrac{\partial^2 y}{\partial t^2}\right)=\dfrac{\partial y}{\partial t}+z-\mu^2(1-z^2)y+\mu^2\alpha(x)\cos t \end{cases} \quad (1)$$

Здесь $x\in[0,\ell], z, y$ – неизвестные скалярные функции, ε,μ – два малых положительных параметра, $\alpha(x)$ – непрерывно дифференцируемая функция.

Зададим для решений $z=z(x,t,\varepsilon,\mu), y=y(x,t,\varepsilon,\mu)$ системы (1) граничные при $x=0, x=\ell$ условия

$$z|_{x=0}=z|_{x=\ell}=y|_{x=0}=y|_{x=\ell}=0 \quad (2)$$

Будем искать 2π - периодическое по t решение задачи (1), (2).

При $\mu=0$ или $\varepsilon=0$ система (1) вырождается в систему обыкновенных дифференциальных уравнений, следовательно, для определения решения вырожденной системы требуются не все дополнительные условия, заданные для системы (1), а лишь их часть-условие периодичности по t . Для задачи (1), (2) реализуется критический случай.

В этой задаче будет построена асимптотика периодического решения по невязке.

Вырожденная система имеет семейства 2π-периодических решений, а период малой вынуждающей силы также равна 2π. Наличие нелинейности обеспечивает существование решения возмущенной ($\mu\neq 0$) системы, период которого также равен 2π.

Формальное 2π - периодическое по t решение задачи (1), (2) будем искать в виде

$$u(x,t,\varepsilon,\mu)=\bar{u}(x,t,\varepsilon,\mu)+\prod u(\xi,t,\varepsilon,\mu)+Qu(\eta,t,\varepsilon,\mu)=$$

$$=\sum_{k=0}^{\infty}\mu^k[\bar{u}_k(x,t,\varepsilon)+\prod_k u(\xi,t,\varepsilon)+Q_k u(\eta,t,\varepsilon)] \quad (3)$$

Здесь $\xi=\dfrac{x}{\varepsilon\mu}, \eta=\dfrac{(\ell-x)}{\varepsilon\mu}.$

В (3) и в дальнейшем под u понимается z и y в совокупности, т.е. если выписывается некоторое соотношение для u, то это значит, что имеют место два в точности такие же соотношения для z и y .

Регулярные члены $\bar{u}_k(k=0,1,2...)$ определяются [1] путем формальной подстановки в систему (1) ряда

$$\bar{u}(x,t,\varepsilon,\mu) = \sum \mu^k \bar{u}_k(x,t,\varepsilon)$$

и приравнивания коэффициентов при одинаковых степенях μ, тогда для $\bar{z}_k$, $\bar{y}_k$ получается система

$$\begin{cases} \dfrac{\partial \bar{z}_k}{\partial t} = \bar{y}_k + \varepsilon^2\left(\dfrac{\partial^2 \bar{z}_{k-2}}{\partial x^2} - \dfrac{\partial^2 \bar{z}_{k-2}}{\partial t^2}\right) \\ \dfrac{\partial \bar{y}_k}{\partial t} = -\bar{z}_k + \varepsilon^2\left(\dfrac{\partial^2 \bar{y}_{k-2}}{\partial x^2} - \dfrac{\partial^2 \bar{y}_{k-2}}{\partial t^2}\right) + (1-\bar{z}_0^{\,2})\bar{y}_{k-2} - 2\bar{z}_0\bar{y}_0\bar{z}_{k-2} + N_k \end{cases} \qquad (\mu^k)$$

Здесь через N_k обозначена некоторая функция, зависящая известным образом от $\bar{z}_j, \bar{y}_j$, $j = 0,1,\ldots$ $j < k$.. Нетрудно видеть, что все системы (μ^k) однотипны: они представляют собой системы обыкновенных дифференциальных уравнений и их решения определяются лишь условием периодичности по t.

Для построения функции пограничного слоя соответственно в окрестностях $x = 0$ и $x = \ell$

$$\Pi u(\xi,t,\varepsilon,\mu) = \sum_{k=0}^{\infty} \mu^k \Pi_k u(\xi,t,\varepsilon) \quad , \quad Qu(\eta,t,\varepsilon,\mu) = \sum_{k=0}^{\infty} \mu^k Q_k u(\eta,t,\varepsilon)$$

будем применять стандартную процедуру теории сингулярных возмущений [1,2].

Тогда для определения $\Pi_k u(\xi,t,\varepsilon)$ получим систему вида

$$\begin{cases} \dfrac{\partial^2 \Pi_k z}{\partial \xi^2} = \dfrac{\partial \Pi_k z}{\partial t} - \Pi_k y + \delta(\xi,t,\varepsilon), \\ \dfrac{\partial^2 \Pi_k y}{\partial \xi^2} = \dfrac{\partial \Pi_k y}{\partial t^2} + \Pi_k z + \sigma(\xi,t,\varepsilon) \end{cases} \qquad (\mu^k{}_{\Pi})$$

где

$$\delta(\xi,t,\varepsilon) = \begin{cases} 0, & k = 0,1, \\ \varepsilon^2 \dfrac{\partial^2 \Pi_{k-2} z}{\partial t^2}, & k = 2,3,\ldots \end{cases}, \quad \sigma(\xi,t,\varepsilon) = \begin{cases} 0, & k = 0,1 \\ \varepsilon^2 \dfrac{\partial^2 \Pi_{k-2} y}{\partial t^2} - [1-(\Pi_0 z)^2]\Pi_{k-2} y, & k = 2,3,.. \end{cases}$$

Функции $Q_k u(\eta,t,\varepsilon)$ определяется аналогичными системами.

Дополнительные условия для пограничных функций получим из граничных условий (2) $\Pi_k u(0,t,\varepsilon) = -u_k(0,t,\varepsilon)$. Кроме того, из свойства пограничных функции имеем $\Pi_k u(\xi,t,\varepsilon) \to 0$, $\xi \to \infty$. А из условия 2π-периодичности по t имеем

$$\bar{u}_k(x,t,\varepsilon) = \bar{u}_k(x,t+2\pi,\varepsilon), \qquad \Pi_k u(\xi,t,\varepsilon) = \Pi_k u(\xi,t+2\pi,\varepsilon)$$

Аналогичные дополнительные условия будут и для функций $Q_k u$.

ЗАКЛЮЧЕНИЕ

Теорема. При достаточно малых ε, система (1) с граничными условиями (2) имеет формальное 2π-периодическое по t решение $z(x,t,\varepsilon,\mu)$, $y(x,t,\varepsilon,\mu)$, представимое в виде рядов (3) и при постановке в систему (1) частичных сумм N-ого порядка ряда (3) равенство (1) оказывается справедливым с точностью до величин порядка $0(\mu^{N+2})$.

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ILMIY MATNLARDA EKSPRESSIVLIK VA EMOTSIONALLIKNING QO‘LLANILISHI

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ANNOTATSIYA

Ushbu maqolada ilmiy matnlardagi ekspressivlik va emotsionallikni muhim jihatlari o‘rganilgan, uning birqancha, matnning o‘quvchilar tomonidan qabul qilinishiga, qiziqish uyg‘otishiga va fikrlarning ta’sirchanligini oshirishga yordam berish jihatlari ko‘rib chiqilgan. Ilmiy matnda ekspressivlik va emotsionallikni o‘rganish tarixi, lingvistika, psixologiya va adabiyot nazariyasi rivojlanishi hissa qo‘shgan olimlar haqida ma’lumotlar keltirilgan.

Kalit so‘zlar: Ilmiy matn, ekspressivlik, emotsionallik, his-tuyg‘ular, fikrlar, til va nutq, til tizimi, uzatuvchi va qabul qiluvchi, ifoda va obrazlilik.

ABSTRACT

In this article, the important aspects of expressiveness and emotionality in scientific texts are studied, some of them are considered to help the acceptance of the text by students, arouse interest and increase the effectiveness of thoughts. The scientific text contains information about the history of the study of expressiveness and emotionality, linguistics, psychology, and scientists who contributed to the development of literary theory.

Keywords: Scientific text, expressiveness, emotionality, feelings, thoughts, language and speech, language system, transmitter and receiver, expression and imagery.

KIRISH

Muloqotning asosiy vositasi bo‘lgan til shunchaki ma’lumot uzatish vositasi emas, balki so‘zlovchining so‘zlarga sub’ektiv munosabatini ifodalash usulidir. R. Jeykobson tashabbusi bilan tilning oltita funksiyasi ajratilgan, ya’ni *referent*, *she’riy*, *emotiv*, *konativ*, *fatik* va *metalingual* (Jacobson, 1975). Nutqda vujudga kelgan fikr, demak, ekspressiv xulq-atvor va keskinlikning turli darajalari bilan bezatilgan matn tilning

emotsional funktsiyasining natijasi bo‘lib, u “so‘zlovchining hissiy holati, uning ekstralingvistik hodisalar va ob‘ektlarga sub‘ektiv munosabati” sifatida qabul qilinadi. [1]

Shuni ta’kidlash kerakki, ekspressivlik tilshunoslikning asosiy muammolaridan biridir, chunki u inson tilining individual nuqtai nazari, xususan, so‘zlovchining nutqqa hissiy munosabati bilan bevosita bog‘liqdir. Ilmiy matnda ekspressivlik — bu muallifning fikrlarini, g‘oyalarini va ma’lumotlarini o‘quvchilarga taqdim etishda qo‘llaniladigan til va uslublar orqali hosil qilinadigan ta’sirchanlik. Ekspressivlik ilmiy matnni yanada jonli va qiziqarli qiladi, o‘quvchilarning e’tiborini jalb qiladi va hissiy aloqani kuchaytiradi. [2]

Ekspressivlikning asosiy jihatlari:

❖ So‘z tanlovi: Muallif tanlagan so‘zlar va iboralar matnning hissiy rang-barangligini belgilaydi. Tasviriy, kuchli va muayyan his-tuyg‘ularni ifodalovchi so‘zlar ishlatilishi kerak.

❖ Uslub: Yozish uslubi, o‘quvchilar bilan muallif o‘rtasida qanday aloqani o‘rnatishiga ta’sir qiladi. Rasmiy yoki samimiy uslubda yozish ekspressivlikni oshirishi mumkin.

❖ Metafora va tasvirlar: Obrazli ifodalar va metaforalardan foydalanish, matnni jonlantiradi va o‘quvchilarni qiziqtiradi.

❖ Mavzuni tanlash: Dolzarb va hissiy jihatdan ahamiyatli mavzular ekspressivlikni oshiradi, chunki ular o‘quvchilarning e'tiborini yanada jalb qiladi.

❖ Struktura: Fikrlarni qanday tartibda taqdim etish va asosiy g‘oyalarni qanday rivojlantirish, matnning ekspressivligini belgilaydi.

Ekspressivlik ilmiy matnda muhim o‘rin tutadi, chunki u o‘quvchilarning qiziqishini oshiradi va ma’lumotlarni yanada samarali yetkazishga yordam beradi. Mualliflar ushbu jihatlarni hisobga olib, o‘z ishlarini yanada ta'sirchan va esda qolarli qilishlari mumkin. [3]

Ilmiy matnda emotsionallik — bu muallifning o‘z fikrlarini, g‘oyalarini va ma’lumotlarini taqdim etish jarayonida hissiy elementlarni qo‘llashidir. Emotsionallik matnni yanada ta’sirchan, qiziqarli va o‘quvchilar bilan bog‘lanadigan qiladi.

Emotsionallikning asosiy jihatlari:

❖ Hissiy ifoda: Muallifning his-tuyg‘ularini ifodalash qobiliyati. Bu, masalan, muallifning g‘oyalariga nisbatan qiziqish, qayg‘u, hayrat yoki boshqa hissiyotlarni o‘quvchilarga yetkazishi orqali amalga oshiriladi.

❖ Mavzu va kontekst: Tanlangan mavzu va uning dolzarbligi emotsionallikni oshiradi. O‘quvchilarni qiziqtiradigan

va ularda hissiy reaktsiyalar uyg‘otadigan mavzular ko‘proq emotsional ta’sir ko‘rsatadi.

❖ Misollar va hikoyalar: O‘quvchilarga yaqin bo‘lgan shaxsiy hikoyalar yoki real hayot misollari, emotsional ta’sirni kuchaytiradi. Bunday misollar o‘quvchilarni jalb qilishda muhim ahamiyatga ega.

❖ O‘quvchi bilan aloqa: Muallifning o‘quvchilarga to‘g‘ridan-to‘g‘ri murojaat qilishi, savollar berishi yoki fikrlarni baham ko‘rishi emotsional bog‘lanishni kuchaytiradi.

❖ Usul va stil: Muallifning yozish uslubi va ohangi, emotsional ifodalar qanday taqdim etilayotganini belgilaydi. Ochiq va samimiy uslub, o‘quvchilarga his-tuyg‘ularni yaxshiroq etkazishga yordam beradi.

TADQIQOT METODOLOGIYASI

Emotsionallik ilmiy matnda o‘quvchilarning e’tiborini jalb qilish va ularning fikrlarini kuchaytirishda muhim rol o‘ynaydi. Mualliflar emotsional jihatlarni hisobga olib, o‘z matnlarini yanada qiziqarli va ta'sirchan qilishlari mumkin. Bu o‘z navbatida, o‘quvchilarning ma'lumotlarni qabul qilishini yaxshilaydi va ilmiy fikrlarni kuchaytiradi. [4]

Til asosiy aloqa vositasi bo'lib, shunchaki ma'lumot uzatish vositasi emas, balki so'zlovchining so'zlarga sub'ektiv munosabatini ifodalash usulidir. Ekspressivlik umumiy lingvistik kategoriyadir va shuning uchun u barcha til darajasiga, shuningdek, tegishli lingvistik birliklarga xosdir. Keng miqyosda ekspressivlik nutqning obrazliligi va ifodasining kattalashishi sifatida aniqlanadi.

Ilmiy matnda ekspressivlik va emotsionallikni shakllantiruvchi omillar bir nechta jihatlardan iborat. Ular orasida:

1. Til va uslub: Ilmiy til aniq, lo‘nda va rasmiy bo‘lishi kerak, lekin ba’zi holatlarda so‘z tanlash va uslub yordamida emotsional ta’sirni oshirish mumkin. Masalan, kuchli fe’llar yoki obrazli ifodalar ishlatish matnni jonlantiradi.

2. Rasmiylik darajasi: Ilmiy matnlar ko‘pincha rasmiy va ob’ektiv bo‘lishi kerak, lekin muallifning shaxsiy fikrlari yoki tajribalari kiritilganda, matn emotsional tus olishi mumkin.

3. Mavzuning ahamiyati: Mavzu o‘quvchiga qiziqarli yoki muhim bo‘lsa, bu his-tuyg‘ularni kuchaytiradi. Masalan, ekologiya yoki sog‘liq masalalari bo‘yicha ilmiy izlanishlar ko‘proq hissiy javoblar keltirishi mumkin.

4. Maqsad va auditoriya: Muallifning maqsadi va matnning kimga yo‘naltirilgani ham emotsionallikka ta’sir qiladi. O‘quvchilarga murojaat qilish va ularni jalb qilish uchun emotsional elementlar qo‘shilishi mumkin.

5. Struktura va tarqatish: Matnni qanday tartibda taqdim etish, argumentlarni qanday bayon etish ham o‘quvchida emotsional reaktsiyalarni shakllantirishi mumkin. Masalan, muhim fikrlarni ta’kidlash yoki qisqa va ta’sirchan misollar keltirish. Bu omillar ilmiy matnning ekspressivligini va emotsionalligini shakllantirishda muhim rol o‘ynaydi.

NATIJALAR VA TAHLIL

1-jadval

Ilmiy matnda ekspressivlik va emotsionallikni shakllantiruvchi omillar:

Til va uslub	**So‘z tanlovi**: Mualliflar o‘z fikrlarini ifodalashda kuchli, tasviriy va obrazli so‘zlardan foydalanishlari mumkin. Masalan, “kuchli ta’sir” o‘rniga “yuksak ta’sir” kabi iboralar.	Shaxsiy uslub**:** O‘z fikrlarini ifodalashda muallif o‘z shaxsiy tajribalarini kiritishi orqali matnning emotsional o‘lchamini oshirishi mumkin.
Mavzu va uning ahamiyati	**Mavzuning dolzarbligi**: O‘quvchilarga qiziqarli bo‘lgan yoki dolzarb masalalar (masalan, iqlim o‘zgarishi, sog‘liq) haqida yozilganda, matn ko‘proq hissiy ta’sir ko‘rsatishi mumkin.	**Ijtimoiy va madaniy kontekst**: Mavzu ijtimoiy ahamiyatga ega bo‘lsa, muallif o‘z fikrlarini kuchaytirish uchun emotsional argümanlar keltirishi mumkin.
Strukturaviy omillar	**Fikrlar tartibi**: Argumentlarni va dalillarni qanday tartibda taqdim etish o‘quvchining e’tiborini oshirishi va hissiyotlarni uyg‘otishi mumkin. Masalan, avval muammo haqida yozib, keyin echimlar keltirish.	**Taqdimot usuli**: Matnni slaydlar yoki grafikalar yordamida taqdim etish ham emotsional ta’sirni oshirishi mumkin.
O‘quvchi bilan aloqa	**Murojaat usuli**: Muallif o‘quvchilarga murojaat qilishi, masalan, “Siz hech o‘ylab ko‘rganmisiz?” kabi savollar berish orqali hissiy aloqani kuchaytirishi mumkin.	**Interaktivlik**: O‘quvchilarni fikr bildirishga yoki muhokama qilishga chaqirish, ularning hissiy ishtirokini oshiradi.
Emotsional misollar	**Hissiy hikoyalar**: Ilmiy matn ichiga kiritilgan qisqa hikoyalar yoki misollar, o‘quvchining hissiy ta’sirini oshirishi mumkin.	**Statistikalar va tadqiqotlar**: Odatda quruq ko‘rinadigan raqamlar, kontekstga qo‘shilganda, ko‘proq emotsional ahamiyatga ega bo‘lishi mumkin.

Bu omillar ilmiy matnlarni yanada ekspressiv va emotsional qilishi mumkin. Ular orqali muallif o‘z fikrlarini o‘quvchilar uchun qiziqarli va esda qolarli tarzda ifodalaydi. Ilmiy matnda ekspressivlik va emotsionallik muhim ahamiyatga ega, chunki ular matnning o‘quvchilar tomonidan qabul qilinishiga, qiziqish uyg‘otishiga va fikrlarning

ta’sirchanligini oshirishga yordam beradi. Ushbu jihatlarni ko‘rib chiqaylik:

Ekspressivlik

1. So‘z tanlovi**:** Tanlangan so‘zlar va iboralar matnning tonini belgilaydi. Tasviriy va kuchli so‘zlar foydalanilganda, matn yanada jonli va o‘quvchining e’tiborini jalb qiladi.

2. Uslub va grammatik konstruktsiyalar: Murakkab va rang-barang grammatik tuzilmalar, masalan, metaforalar, ta’sirchanligini oshirishi mumkin. Bunday uslubiy elementlar matnni ma’naviy jihatdan boyitadi.

3. Rag‘batlantirish va ta’sir: Muallif o‘z fikrlarini ifodalashda samimiy va qizg‘in ohangda yozganida, o‘quvchilarda qiziqish va his-tuyg‘ularni uyg‘otadi. [5]

Emotsionallik

1. Mavzuning ahamiyati: Emotsional jihatlarni keltirib chiqaradigan mavzular (masalan, sog‘liq, ekologiya) ko‘proq hissiy munosabatlar uyg‘otishi mumkin. Bu o‘quvchilarning diqqatini kuchaytiradi.

2. Misollar va hikoyalar: O‘quvchilarga yaqin bo‘lgan misollar yoki shaxsiy hikoyalar keltirilganda, matnning hissiy ta’siri oshadi. Bunday misollar o‘quvchilarni yanada jalb qiladi.

3. Qaror va muammolar: Muammoni taqdim etish va uning yechimini taklif qilish orqali muallif emotsional aloqani kuchaytirishi mumkin. O‘quvchilar muammoni his qilganda, ularda qiziqish paydo bo‘ladi.

Ilmiy matnda ekspressivlik va emotsionallik o‘quvchilarning qiziqishini oshirish va ma’lumotlarni yanada samarali taqdim etishga yordam beradi. Bularni hisobga olgan holda, mualliflar o‘z ishlarini yanada ta’sirchan va qiziqarli qilishlari mumkin. [6]

MAVZU BO‘YICHA ADABIYOTLARNI TAHLILI

Ilmiy matnda ekspressivlik va emotsionallikni o‘rganish tarixi asosan XX asrda, lingvistika, psixologiya va adabiyot nazariyasi rivojlanishi bilan bog‘liq. Quyida ushbu sohalarning asosiy bosqichlari va olimlar keltirilgan:

XX asrning o‘rtalari

1. *Mikhail Bakhtin:* Bakhtin, 1920-yillarda, til va ifoda uslublari o‘rtasidagi aloqalarni o‘rganib, emotsionallik va ekspressivlik masalalariga diqqat qaratgan. *“Problems of Dostoevsky's Poetics”* Bakhtinning bu asari dialogik nazariya va ifodalar orqali emotsionallikni qanday shakllantirish mumkinligini o‘rganadi. “Speech Genres and Other Late Essays” Bu asar turli so‘z janrlarining ekspressiv va emotsional jihatlarini tahlil qiladi. [7]

2. *Roman Jakobson:* 1930-yillarda, Jakobson tilning kommunikativ funktsiyalarini tahlil qilib, ekspressivlikning til va adabiyotdagi ahamiyatini ko‘rsatdi. [8]

1960-1970-yillar

3. *Ruth Wodak:* Diskurs tahlili va emotsionallik haqida tadqiqotlar olib borib, ijtimoiy va siyosiy kontekstlardagi emotsional ifodalarni o‘rganishga katta hissa qo‘shdi. Uning “Discourse and Discrimination” asarida til va emotsionallik o‘rtasidagi munosabatlarni o‘rganib, ijtimoiy matnlardagi hissiy ta’sirlarni tahlil qiladi. [9]

4. *Tzvetan Todorov:* 1960-yillarda adabiyotda emotsional elementlarni va ularning ta’sirini o‘rganishga qaratilgan tadqiqotlar olib bordi. “The Fantastic: A Structural Approach to a Literary Genre” Todorovning bu asari adabiyotdagi hissiy elementlarni va ularning ta’sirini tahlil qiladi. [10]

5. *Gerard Genette:* “Narrative Discourse: An Essay in Method” Genette, hikoya tuzilishi va ularning emotsional ta’siri haqida fikrlar keltiradi. [11]

1980-yillar va keyin Psixologik va lingvistik tadqiqotlar: 1980-yillarda va keyinroq, emotsional psixologiya va tilshunoslikda ko‘plab tadqiqotlar olib borilib, emotsionallik va ekspressivlik tushunchalari chuqurlashtirildi. Bugungi kunda, ekspressivlik va emotsionallikni o‘rganish, ko‘plab sohalarda, jumladan, tilshunoslik, psixologiya, adabiyot nazariyasi va kommunikatsiya tadqiqotlarida davom etmoqda. Bu sohalardagi tadqiqotlar, o‘quvchilarning hissiy reaktsiyalarini, mualliflarning uslubini va ilmiy matnlarning ta’sirini yanada chuqurroq tushunishga yordam beradi. [12]

O‘zbekistonlik olimlar ham ilmiy matnda ekspressivlik va emotsionallikni o‘rganishga katta hissa qo‘shgan. Quyidagi olimlar ushbu sohada muhim tadqiqotlar olib borgan:

1. *Abdulaziz Mansurov:* Tilshunoslik va adabiyot nazariyasidagi ishlarida ekspressivlik va emotsionallik masalalarini o‘rganib, tilning hissiy jihatlarini tahlil qilgan. “Til va adabiyot nazariyasi” – Ushbu asarda til va adabiyotning hissiy jihatlari, ekspressiv ifodalar tahlil etilgan.

2. *O‘tkir Hoshimov:* Adabiyotshunoslikda va tahlil sohalarida, matndagi hissiy elementlarni o‘rganishga qaratilgan tadqiqotlar olib borgan. “Adabiyotshunoslik masalalari” – Bu asarda adabiyotdagi hissiy ifodalar va ularning o‘quvchiga ta’siri haqida fikrlar yuritilgan.

3. *Erkin Khoshimov “Emotsionallik va ekspressivlik: nazariya va amaliyot*” – Bu asar emotsionallik va ekspressivlikning nazariy asoslarini va amaliyotdagi qo‘llanilishini ko‘rsatadi.

4. *Shodiyor Shodiev:* Lingvistika va psixolingvistika sohasida emotsionallikni tahlil qilish, shuningdek, matnlarning hissiy ta’sirini o‘rganishga alohida e’tibor qaratgan. “Psixolingvistika va tilshunoslik” – Asar psixolingvistika sohasida emotsionallik va ekspressivlik masalalarini o‘rganishga bag‘ishlangan.

5. *Muhammadjon Tohirov*: Adabiyot va tilshunoslik sohasidagi tadqiqotlari orqali ekspressivlik va emotsionallikni tahlil etishga oid yangi yondashuvlar taklif qilgan. *“Ekspressiv tilshunoslik”* – Ushbu asarda ekspressiv til va uslublar, ularning ilmiy matndagi ahamiyati tahlil qilingan.

6. Dilorom Rasulova:“Emotsionallik va ularning kommunikativ funksiyalari” – Dissertatsiya ishida emotsionallik va uning kommunikativ ahamiyati o‘rganilgan.

Bu olimlar o‘z ishlarida ekspressivlik va emotsionallikning matndagi ahamiyatini, ularning muallif va o‘quvchilar o‘rtasidagi aloqaga ta’sirini chuqur o‘rganishgan. Ularning tadqiqotlari O‘zbekiston til va adabiyotining rivojlanishiga hissa qo‘shmoqda. Ilmiy matnda ekspressivlik va emotsionallik o'rgangan O'zbek olimlarining asarlari O‘zbekistonlik olimlar ilmiy matnda ekspressivlik va emotsionallikni o‘rganishda bir qator asarlar yaratgan.

Ilmiy matnda ekspressivlik va emotsionallikni tahlil qilish jarayoni muallifning uslubi va taqdimotidan tortib, o‘quvchilarning hissiy reaktsiyalarigacha bo‘lgan ko‘plab jihatlarni o‘z ichiga oladi. Ushbu tahlil natijalari matnning ta’sirchanligini, o‘quvchilarga qanchalik ta’sir ko‘rsatishini va hissiy bog‘lanishini aniqlashga yordam beradi.

Tahlil jarayoni

1. **Mazmuniy tahlil**:
   - Matndagi asosiy g‘oyalarni va ularning emotsional yukini aniqlash.
   - Muallifning fikrlari qanday tasvirlangan va his-tuyg‘ular qanday ifodalangan.
2. **Stilistik tahlil**:
   - Metafora, personifikatsiya, tasviriy so‘zlar va boshqa stilistik uslublar qanday ishlatilgani.
   - Ushbu uslublarning matndagi emotsional ta’sirini aniqlash.
3. **Diskurs tahlili**:
   - Muallifning muloqot uslublari va qanday kontekstlarda hissiy ifodalar qo‘llanganligini tahlil qilish.
   - O‘quvchilarning hissiy munosabatlariga qanday ta’sir ko‘rsatilgani.
4. **Kvantitativ tahlil**:
   - Emotsional va ekspressiv so‘zlarning chastotalarini hisoblash.

- Matndagi hissiy elementlar va ularning ta’siri haqida statistik ma’lumotlar to‘plash.

5. **Psixologik tahlil**:

- O‘quvchilarning matnni o‘qigandagi hissiy reaksiyalarini o‘rganish (so‘rovnomalar va intervyular orqali).
- O‘quvchilarda paydo bo‘ladigan hissiy tasavvurlarni aniqlash.

Ilmiy matnda ekspressivlik va emotsionallikning tahlili o‘quvchilarning qiziqishi, hissiy aloqalari va muallifning fikrlarini qanday qabul qilishlariga katta ta’sir ko‘rsatadi. Tahlil natijalari ilmiy yozuvni yanada qiziqarli va ta’sirchan qilish uchun muhim ma’lumotlar beradi. Bu tahlil orqali mualliflar o‘z matnlarini rivojlantirish va o‘quvchilar bilan samarali aloqa o‘rnatish imkoniyatiga ega bo‘ladilar.

XULOSA VA TAKLIFLAR

Ekspressivlik va emotsionallik ilmiy matnda muhim o‘rin tutadi, lekin ularning qanday qo‘llanishi ushbu jihatlarni muvozanatlash, o‘quvchilarga ta’sir qilish va ilmiy sifatni saqlab qolish uchun zarur hisoblanadi. Mualliflar o‘z yozuvlarida ushbu jihatlarni to‘g‘ri uyg‘unlashtirishlari kerak. Ekspressivlik va emotsionallik ilmiy matnda ta’sirchanlikni oshirishda muhim rol o‘ynaydi. Mualliflar bu omillarni hisobga olib, o‘z matnlarini yanada qiziqarli va ta’sirchan qilishlari mumkin. Bu, o‘z navbatida, o‘quvchilarning ma’lumotni qabul qilishini yaxshilaydi va ilmiy fikrlarni kuchaytiradi. Ularning uyg‘unligi va muvozanati ilmiy yozuvlarning samaradorligini belgilaydi. Ekspressivlik va emotsionallik ilmiy matnning ta’sirchanligini oshirishda muhim rol o‘ynaydi. Mualliflar bu jihatlarni hisobga olib, o‘z matnlarini yanada qiziqarli va ta’sirchan qilishlari mumkin. Bular o‘quvchilarni jalb qilish, ma’lumotlarni samarali yetkazish va fikrlarni kuchaytirishga yordam beradi.

Ilmiy matnda ekspressivlik va emotsionallik tushunchalari matnning mazmuni va taqdimot uslubiga katta ta’sir ko‘rsatadi. Ushbu jihatlarni ko‘rib chiqamiz:

Ekspressivlik

1. **So‘z tanlovi**: Ekspressivlik, til va ifoda vositalarining rang-barangligini talab etadi. Tanlangan so‘zlar va iboralar matnning ta’sirchanligini oshiradi. Tasviriy so‘zlar va metaforalardan foydalanish matnni jonlantiradi.

2. **Uslub va ton**: Muallifning yozish uslubi va ohangi, o‘quvchiga qanday hissiyotlar etkazishini belgilaydi. Rasmiy uslubda yozish ko‘proq ob’ektivlikni ta’minlasa, samimiy va ochiq uslub hissiy aloqani kuchaytiradi.

3. **Struktura**: Matnni qanday tartibda taqdim etish, fikrlarni qanday rivojlantirish ham ekspressivlikka ta’sir qiladi.

Muammolarni yoritish va yechimlarni taklif qilish orqali o‘quvchining qiziqishini oshirish mumkin.

Emotsionallik

1. **Mavzu va dolzarblik**: O‘quvchilarga qiziqarli yoki dolzarb mavzular (masalan, sog‘liq, ekologiya) emotsional ta’sirni kuchaytiradi. Bunday mavzular o‘quvchilarni jalb qilib, ularda hissiy reaktsiyalar uyg‘otadi.

2. **Hikoyalar va misollar**: O‘quvchilarga yaqin bo‘lgan shaxsiy hikoyalar yoki real hayot misollari, matnning emotsional ahamiyatini oshiradi. Bunday misollar matnni tushunarli va qiziqarli qiladi.

3. **O‘quvchi bilan aloqalar**: Muallif o‘quvchilar bilan to‘g‘ridan-to‘g‘ri muloqot qilish orqali emotsional aloqani kuchaytirishi mumkin. Masalan, savollar berish yoki o‘quvchilarni fikr bildirishga chaqirish.

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FORMATION OF THE FEATURE SPACE AFFECTING THE LEVEL OF URBANIZATION USING PRINCIPAL COMPONENT ANALYSIS

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ABSTRACT

This article is dedicated to studying the factors influencing the level of urbanization using the example of Samarkand region. The study analyzed 96 socio-economic, demographic, and infrastructural indicators for the period 2000-2022. Using the Principal Component Analysis (PCA) method, these factors were reduced to 25 main components. The results identified that economic development, demographic changes, and social infrastructure have the strongest impact on the urbanization process. The article emphasizes the need for a comprehensive approach to effectively manage urbanization processes in Samarkand region. The research findings have not only scientific but also practical significance and can be applied in developing urban development strategies.

Keywords: Urbanization, Samarkand region, PCA, urbanization, demography.

INTRODUCTION

The process of urbanization is one of the most significant socio-economic phenomena in the modern world, profoundly affecting all aspects of society [1]. This complex process is characterized by the concentration of population and economic activities in urban areas. Urbanization involves not only changes in the distribution of population between urban and rural areas but also a comprehensive transformation that impacts all spheres of society [2].

Particularly in developing countries, including Uzbekistan, urbanization processes are occurring at a rapid pace. While this process stimulates economic growth and innovation on one hand, it also poses serious challenges for the environment, infrastructure, and social systems

on the other. To quantitatively assess the level of urbanization, the following formula is typically used:

$$\text{Urbanization_level} = \frac{\text{Urban_population}}{\text{Total_population}} * 100\%. \quad (1).$$

This indicator, determined by this formula, reflects the degree of development of urbanization processes in a country or region and allows for comparison of urbanization status across different areas [3].

Samarkand region, one of the most ancient and culturally significant areas of Uzbekistan, has also been experiencing active urbanization processes in recent years [4]. An in-depth study of the characteristics of these processes and their determining factors is relevant not only at the local but also at the national level. The experience of Samarkand region can provide valuable lessons for other regions as well.

The factors influencing urbanization processes are numerous and diverse. Among them, socio-economic [5], demographic, and infrastructural indicators [6] hold a special place. However, analyzing such a large number of factors simultaneously is a complex task. Therefore, the use of modern statistical methods, particularly Principal Component Analysis (PCA), to reduce the number of factors and identify the most significant components is of great importance [7].

The main objective of this study is to identify factors affecting the level of urbanization using the example of Samarkand region and to determine the most important components by reducing them through PCA. To achieve this goal, the following tasks have been set:

1. Collect and analyze socio-economic, demographic, and infrastructural indicators affecting urbanization processes in Samarkand region from 2000 to 2022;

2. Reduce the collected 96 factors to 25 main components using the PCA method;

3. Assess and analyze the impact of the identified main components on the level of urbanization;

4. Develop recommendations for effective management of urbanization processes in Samarkand region based on the obtained results.

The results of this study have not only scientific but also practical significance and can be applied by local and central government bodies in developing urban development strategies. Moreover, this research methodology can be applied in other regions and provinces, allowing for a deeper understanding and more effective management of urbanization processes in Uzbekistan.

LITERATURE REVIEW

In their co-authored article, Jolliffe, I. T., and Cadima provide a comprehensive analysis of the fundamentals of PCA, its

recent developments, and applications in various fields. They emphasize the importance of PCA in reducing data dimensionality and simplifying complex datasets. The article presents practical applications of PCA in various fields such as biology, economics, and social sciences [8].

Li, X., Zhou, and others use the PCA method to study urbanization processes and predict the growth of future urban areas. They analyzed numerous socio-economic and demographic indicators to identify the main factors influencing urbanization [9].

Abdi, H., and Williams, L. present a deep theoretical foundation and practical application of the PCA method in their article "Principal component analysis. Wiley interdisciplinary reviews: computational statistics". The authors explain in detail the mathematical foundations of PCA, its geometric interpretation, and applications in various fields. They also discuss important points to consider when applying PCA and the limitations of the method. This source can be useful for correctly applying the PCA method in our study and properly interpreting the results [10].

METHODOLOGY

For this study, 96 factors affecting urbanization processes in Samarkand region between 2000 and 2022 were collected and analyzed. This data was obtained from the official website "www.stat.uz" of the State Statistics Committee of the Republic of Uzbekistan. The collected data includes comprehensive indicators reflecting the multifaceted nature of the urbanization process [11].

The factors in the dataset are mainly divided into four main categories: demographic, social, economic, and infrastructural indicators. Demographic factors include population size, birth and death rates, and migration indicators. These factors allow observing the dynamics of urban and rural populations [12].

Social factors include indicators reflecting the living standards of the population. These include income levels, employment rates, achievements in education and healthcare. The number and quality of social infrastructure objects are also taken into account [13].

Among economic factors are indicators such as GDP, volume of industrial and agricultural products, and amount of investments. This data reflects the economic development trends of Samarkand region and shows their impact on urbanization processes [14].

Infrastructural factors include indicators from the transport system (length of roads, passenger traffic volume), communication means (number of internet users), electricity supply, and construction sector. This

data reflects factors that directly influence the expansion of urban areas and the growth of urbanization levels [15].

This comprehensive dataset allows for in-depth analysis of the dynamics of urbanization processes in Samarkand region and identification of key factors influencing this process. Such an approach creates a solid foundation for comprehensive study of urbanization processes and forecasting future trends.

Principal Component Analysis (PCA) is a statistical method used to analyze multidimensional data and reduce its dimensionality [16]. This method is particularly important in studying urbanization processes as the factors influencing urbanization are numerous and diverse.

Urbanization is a complex socio-economic process influenced by demographic, economic, social, and infrastructural factors. We examined 96 different factors using the example of Samarkand region. Analyzing such a large number of factors simultaneously and determining their relative importance is a challenging task. This is where the PCA method demonstrates its effectiveness.

The analysis of factors influencing urbanization using the PCA algorithm consists of the following stages:

Stage 1: Data Preparation

$$X = \begin{bmatrix} x_{11}, x_{1,2}, \dots, & x_{1,96} \\ x_{2,1}, x_{2,2}, \dots, & x_{2,96} \\ \dots & \dots \\ x_{,23,1}, x_{23,2}, \dots, & x_{23,96} \end{bmatrix}$$

Where X represents 96 indicators of Samarkand region from 2000 to 2022

Stage 2: Data Standardization

$$Z = \frac{(X - \mu)}{\sigma}$$

Where Z is the standardized matrix, μ is the mean value vector for each column, σ is the standard deviation vector for each column

Stage 3: Calculating the Covariance Matrix

$$C = \frac{1}{22} * (Z\text{^}T) * Z$$

Where C is the covariance matrix, Z^T is the transpose of matrix Z

Stage 4: Calculating Eigenvalues and Eigenvectors

$$C * v = \lambda * v$$

Where v is the eigenvector, λ is the eigenvalue

Stage 5: Identifying Principal Components

$$\lambda_1 \geq \lambda_2 \geq \lambda_3 \geq \dots \geq \lambda_{96}$$

Eigenvectors represent the principal components. We order them by their eigenvalues

Stage 6: Selecting Principal Components

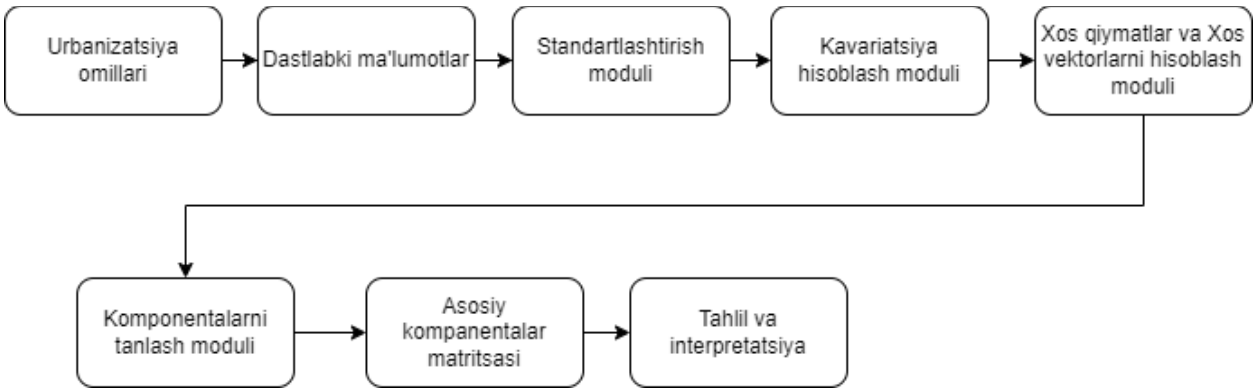
$$EVR = \frac{\lambda_i}{\Sigma\lambda_j}$$

Where $\Sigma\lambda_j$ is the sum of all eigenvalues

Stage 7: Forming the Principal Component Matrix

$$W = [\lambda_1, \lambda_2, \ldots, \lambda_{25}]$$

Thus, the PCA method allows for efficient analysis of large volumes of data in studying urbanization processes, identifying the most important factors, and understanding their interactions. This, in turn, is crucial in developing urban development strategies and managing urbanization processes. The architecture for identifying factors affecting the level of urbanization using the PCA method is as follows:



Architecture for reducing factors affecting the level of urbanization using PCA

RESULTS AND DISCUSSIONS

A deep analysis was conducted on 96 factors influencing urbanization processes in Samarkand region. This analysis revealed several important trends.

Among demographic factors, it was observed that the growth rate of urban population is higher than that of rural population. This, in turn, indicates an intensification of rural-to-urban migration processes. Additionally, the increase in the proportion of young population emerged as a factor accelerating urbanization processes. Analysis of economic factors showed that the share of service sector and industrial production is increasing in Samarkand region. This is leading to the development of urban economy and creation of new job opportunities. The increase in investment volume is also stimulating the development of urban infrastructure and construction of new residential complexes.

Among social factors, a significant increase in the quality and coverage of education and healthcare services was observed.

These factors are increasing the attractiveness of urban life and attracting rural population. Analysis of infrastructural factors showed improvement in the transport system, especially connections with surrounding areas. Moreover, the expansion of internet and mobile communication services is also contributing to the improvement of urban life quality.

As a result of applying the PCA method, the initial 96 factors were reduced to 25 main components. These components explain 85% of the variation in the initial data, ensuring high accuracy of the analysis. The first principal component is associated with overall economic development, including indicators such as GDP, industrial production, and investment volume. The second component reflects demographic changes and combines population size, birth rates, and migration indicators. The third component is related to social infrastructure development, including the number and quality of educational and healthcare institutions.

Analysis of the impact of principal components on the level of urbanization showed that the economic development component has the strongest influence. This indicates that urbanization processes in Samarkand region are mainly driven by economic factors. The demographic change component ranks second, confirming the important role of population dynamics. Although the social infrastructure component ranks third, its importance is increasing year by year. This trend shows that cities need to be attractive not only economically but also socially.

These results demonstrate the need for a comprehensive approach in managing urbanization processes in Samarkand region. Along with stimulating economic development, it is important to improve social infrastructure and take into account demographic changes. This approach will help ensure sustainable and balanced urban development.

CONCLUSION

This study allowed for an in-depth analysis of urbanization processes in Samarkand region. Using Principal Component Analysis (PCA), we reduced 96 different factors to 25 main components, identifying the factors that have the strongest impact on the level of urbanization.

The research results allow us to draw the following main conclusions:

1. Economic development is the main driving force of the urbanization process. GDP growth, increase in industrial production and investment volumes are directly affecting the rates of urbanization.

2. Demographic changes, particularly the increase in young population and rural-to-urban migration processes, are accelerating urbanization.

3. The development of social infrastructure, especially the improvement in quality and coverage of education and healthcare services, is increasing the attractiveness of urban life.

4. The improvement of transport and communication systems is strengthening the links between urban and rural areas, further activating urbanization processes.

Based on these conclusions, the following recommendations can be made:

1. Apply a comprehensive approach in developing urban development strategies, balancing economic, social, and infrastructural factors.

2. Develop rural development programs to manage urbanization processes and reduce the gap between urban and rural areas.

3. Expand education and employment opportunities for young people, thereby facilitating their adaptation to urban life.

4. Consider ecological aspects in developing urban infrastructure, implementing the concept of "green cities".

5. It is recommended to implement modern information technologies, including "smart city" systems, for future monitoring and management of urbanization processes.

The results and recommendations of this study can be useful not only for Samarkand region but also for other regions of Uzbekistan. In the future, it would be appropriate to continue research in this direction, conduct comparative analyses with other regions, and develop long-term forecasts.

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ЯЗЫКОВОЙ ПОТЕНЦИАЛ И ЕГО ВЛИЯНИЕ НА УСПЕШНОСТЬ ОБУЧЕНИЯ ИНОСТРАННОМУ ЯЗЫКУ

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АННОТАЦИЯ

Данная статья анализирует структуру языкового потенциала, его компоненты, а также роль в учебном процессе. Рассматриваются также психологические и педагогические аспекты развития языкового потенциала, которые способствуют формированию у обучающихся мотивации, гибкости мышления и готовности к коммуникативным взаимодействиям.

Ключевые слова: языковой потенциал, языковые способности, компоненты, мышление, память, восприятие, креативность

ABSTRACT

This article analyzes the structure of linguistic potential, its components, and its role in the educational process. It also examines the psychological and pedagogical aspects of developing linguistic potential that contribute to the formation of motivation, flexible thinking, and readiness for communicative interactions among learners.

Keywords: linguistic potential, language abilities, components, thinking, memory, perception, creativity.

ВВЕДЕНИЕ

В условиях глобализации и интенсивного культурного обмена изучение иностранных языков становится одной из ключевых задач современного образования. В процессе изучения языка важное значение приобретает понятие языкового потенциала, которое рассматривается как совокупность врожденных и приобретенных способностей, влияющих на успешность овладения иностранным языком.

МЕТОДОЛОГИЯ

Языковой потенциал как понятие долгое время оставался малоизученным в педагогической науке, хотя его отдельные аспекты затрагивались в исследованиях, посвященных когнитивным способностям, креативности и эмоциональному интеллекту.

Психолого-педагогические исследования выявили, что развитие языкового потенциала связано не только с интеллектуальными способностями, но и с особенностями памяти, внимания, эмоционального фона и мотивации учащегося. Так, отечественные и зарубежные ученые (например, Выготский, Гарднер) подчеркивали важность комплексного подхода, предполагающего всестороннее развитие языковых и метакогнитивных способностей для успешного изучения языка.

Современные психолого-педагогические исследования предлагают рассматривать языковой потенциал как динамическую систему, включающую способности к восприятию и воспроизведению языковой информации, креативность и гибкость мышления, а также мотивационную и эмоциональную готовность к изучению иностранного языка. Исследования также указывают на то, что языковой потенциал развивается на протяжении всей жизни и может быть значительно усилен при условии использования эффективных методов обучения и создания поддерживающей образовательной среды.

РЕЗУЛЬТАТЫ

Структура языкового потенциала: компоненты и их взаимосвязь

В психолого-педагогических исследованиях выделяются несколько основных компонентов, которые составляют структуру языкового потенциала. Среди них наиболее значимыми являются когнитивный, лингвистический, креативный, мотивационный и эмоциональный компоненты.

1. Когнитивный компонент. Включает способности к абстрактному мышлению, анализу и синтезу информации, а также зрительную и слуховую память. Когнитивные процессы определяют скорость и качество усвоения языковых конструкций, формирование грамматических навыков и способность к обобщению.

2. Лингвистический компонент. Включает базовые языковые способности, такие как фонетическое восприятие, понимание синтаксических структур и умение формировать логически связанные предложения. Развитие этого компонента критично для формирования устойчивых языковых навыков.

3. Креативный компонент. Способность генерировать новые идеи и находить нестандартные решения также важна для овладения иностранным языком. Креативность помогает учащимся гибко реагировать на изменения в коммуникативных ситуациях и находить эффективные способы выразить свои мысли.

4. Мотивационный компонент. Мотивация играет ключевую роль в обучении иностранному языку, так как она

стимулирует активность и готовность к преодолению трудностей. Поддержка интереса к изучаемому языку способствует усвоению знаний и сохранению их в долговременной памяти.

5. Эмоциональный компонент. Эмоциональная готовность к обучению иностранному языку связана с самооценкой, уверенностью в своих силах и позитивным отношением к изучению. Этот компонент влияет на готовность к речевой практике, что в свою очередь способствует улучшению навыков восприятия и воспроизведения языковой информации.

Эти компоненты не существуют отдельно друг от друга; они тесно взаимосвязаны, и их комплексное развитие необходимо для максимального раскрытия языкового потенциала учащегося [Иванова А.Б., 2023].

ОБСУЖДЕНИЕ

С точки зрения педагогики, развитие языкового потенциала необходимо для повышения эффективности процесса обучения иностранному языку. Основная задача педагога заключается в том, чтобы создать условия для развития всех компонентов языкового потенциала учащегося. Важнейшими аспектами здесь являются:

• Создание мотивирующей учебной среды. Поддержка интереса к языку помогает учащимся преодолевать трудности, повышает их самооценку и уверенность в своих способностях.

• Использование индивидуализированного подхода. Каждому учащемуся присущ свой уровень языкового потенциала и уникальные особенности восприятия. Учитывая индивидуальные способности, учитель может адаптировать программу обучения под потребности конкретного ученика, помогая ему развить слабые стороны и подчеркнуть сильные.

• Применение методов активного обучения. Активные методы обучения, такие как игровые ситуации, дискуссии и творческие задания, способствуют развитию креативного компонента языкового потенциала и позволяют учащимся чувствовать себя более уверенно.

• Формирование положительной самооценки и уверенности. Педагог должен способствовать укреплению уверенности учащихся, поддерживать их успехи и создавать положительный эмоциональный настрой. Это помогает учащимся справляться с трудностями и развивать эмоциональную устойчивость в процессе изучения языка [Петрова, Е. В., 2023]

ЗАКЛЮЧЕНИЕ

Языковой потенциал является важнейшим фактором, определяющим успешность обучения иностранному языку. Систематическое развитие его компонентов помогает учащимся быстрее адаптироваться к условиям иностранной языковой среды, повышает их мотивацию и уверенность в своих силах. Педагогам важно учитывать все аспекты языкового потенциала, чтобы создавать эффективные методики и подходы, способствующие его раскрытию. Подход, ориентированный на развитие языкового потенциала, обеспечивает не только успешное овладение языковыми навыками, но и формирует у учащихся гибкость мышления, креативность и готовность к межкультурному взаимодействию.

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ИНДИВИДУАЛЬНОЕ ПОТЕНЦИОМЕТРИЧЕСКОЕ ОПРЕДЕЛЕНИЕ КАТИОНОВ МЕТАЛЛОВ Cu (II), Zn (II) И Cr (III) В ВОДНО-НЕВОДНЫХ И СМЕШАННЫХ РАСТВОРАХ

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АННОТАЦИЯ

В данной работе представлены результаты потенциометрического определения водных, водно-неводных и смешанных растворителей катионов меди (II), цинка (II) и хрома (III): (пропанол-2, ацетон, метилэтилкетон, толуол, тетрахлорметан, диметилформамид) и их смеси с водой в соотношении 1:1 и 1:19 по объему, приведены соотношения кислотно-основного титрования. Количественные результаты титрования на основе килоты указанных катионов Cu^{2+}, Zn^{2+} и Cr^{3+} основаны на константах кислотности этих катионов, оцененных в среде растворителя, указанной выше. Было изучено влияние физических и химических свойств растворителей на кислотно-основное титрование. Из-за увеличения доли неводного растворителя в растворе снижается диэлектрическая проницаемость раствора, и это приводит к увеличению возможности количественного определения кислотно-основного титрования.

Ключевые слова: потенциометрия, катионы металлов, медь, цинк, хром, диэлектрическая проницаемость, константа кислотности.

ABSTRACT

This work presents the results of the potentiometric determination of aqueous, non-aqueous and mixed solvents of copper (II), zinc (II) and chromium (III) cations: (propanol-2, acetone, methyl ethyl ketone, toluene, carbon tetrachloride, dimethylformamide) and their mixtures with water in a ratio of 1:1 and 1:19 by volume, the ratios of acid-base titrations are given. The quantitative results of the titration on a per kilote basis for the indicated cations Cu2+, Zn2+ and Cr3+ are based on the acidity constants of these cations assessed in the solvent environment specified above. The influence of the physical and chemical properties of solvents on acid-base

titrations was studied. Due to the increase in the proportion of non-aqueous solvent in the solution, the dielectric constant of the solution decreases, and this leads to an increase in the ability to quantify acid-base titrations.

Keywords: potentiometry, metal cations, copper, zinc, chromium, dielectric constant, acidity constant.

ВВЕДЕНИЕ

Известно, что катионы тяжелых металлов в растворах имеют свои кислотные свойства. Поэтому их также называют апротонными кислотами или кислотами Льюиса. Кислотные свойства ионов металлов зависят от их положения в периодической таблице Менделеева, от ионного заряда и от количества анионов, связанных с катионом. Катионы Cu^{2+}, Zn^{2+} и Cr^{3+} являются апротоновыми кислотами, которые не удерживают протоны, и обладают увлажняющими кислотными свойствами различной силы в растворах в зависимости от ионного заряда. Согласно литературным данным, работ по их титриметрическому кислотно-основному определению мало. С учетом их кислотных свойств в смешанном водно-неводном растворе можно титровать ионы как кислоты. В силу этого, нами проведен их титриметрический анализ в среде смешанных с водой неводных растворителях. Представлял интерес определение содержания апротонных кислот, играющих важное значение в жизнедеятельности живых организмов. Для разработки методов анализа этих апротонных кислот брали модельные растворы исследуемых веществ и титровали их на основе кислотно-основных реакций. Как было показано выше, апротонные кислоты проявляют кислотные свойства различной силы. Из вышеперечисленных апротонных кислот медь и цинк являются двухосновными кислотами, а хром - трехосновной кислотой. Учитывая кислотность различных растворов апротонных кислот можно рекомендовать методы их кислотно-основного потенциометрического титрования. В водном растворе они, в основном, титруются по второй константе кислотности. Добавление к воде неводных смешивающихся с водой растворителей улучшает условия титрования апротонных кислот. При этом можно добиться того, что они могут титроваться по всем константам кислотности.

МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЯ

В качестве объектов выбраны хлоридов и сульфатов апротонных кислот меди (II), цинка (II) и хрома (III). Так, в качестве растворителей использовали этанол, пропанол-2, ацетон,

метилэтилкетон, толуол, тетрахлорметан, диметилформамид их смеси с водой.

Во время титрования в качестве титрантов применяли растворы этилата калия и пропилатов калия в этаноле и пропанол-1, а также растворы ацетата калия в подходящих средах растворителей. В качестве метода исследования мы использовали потенциометрическое титрование из методов электрохимического анализа. Для оценки значений pK_a использован метод Гендерсона, основанных на потенциометрическом титровании со стеклянным водородселективным и хлорсеребряным электродами. Сущность метода заключается в том, что при одинаковых условиях титруются две кислоты раствором сильной щелочи: одна из них служит стандартом, а вторая - исследуемой кислотой. Для кислоты - стандарта должна быть известна константа кислотности в данном растворителе. По результатам потенциометрического титрования строят кривые титрования и по этим кривым определяют значения потенциалов полутитрования и рассчитывают значения показателей констант кислотности по формуле:

$$pK_x = pK_o \pm \frac{E^x_{1/2} - E^o_{1/2}}{\theta}$$

Где: pK_x – показатель константы кислотности исследуемой кислоты; pK_o – показатель константы кислотности кислоты стандарта; $E^x_{1/2}$ – потенциал полутитрования исследуемой кислоты, мВ; $E^o_{1/2}$ – потенциал полутитрования кислоты стандарта, мВ; θ=58 (при 20^0C) мВ или θ=59 (при 25^0C) мВ. В качестве кислоты стандарта использовали бензойную кислоту.

В качестве индикаторного электрода использовали водород-селективный электрод, который настраивали по методике, приложенной к pH-метру, по двум буферным растворам (в водном растворе). Электродом сравнения служил хлорсеребряный электрод, наполненный насыщенным водным раствором дважды перекристаллизованного хлорида калия.

ПОЛУЧЕННЫЕ РЕЗУЛЬТАТЫ

В табл.1 в приведены результаты определения хрома (III) в виде $CrCl_3$ и $Cr_2(SO_4)_3$ не только в среде спиртов, но и кетонов, ДМФА, толуола и четыреххлористого углерода. Как видно из данных табл.1 уменьшением количества кислот в исследуемом растворе относительное стандартное отклонение несколько растет. Для хрома (III) величина относительного стандартного отклонения определения также зависит как от количества вещества, так и от состава

растворителя и диэлектрической проницаемости среды. Так, при титровании малых количеств хрома (III) оно выше.

Результаты потенциометрического определения хрома (III) в растворителях с разной диэлектрической проницаемостью

(n=5, $\bar{x} \pm \Delta x$, P=0,95)

Таблица 1.

Апротонная кислота	Растворитель	ε	Введено, мг	Найдено, мг	S	S_r
$CrCl_3$	Вода	78,3	8,64	8,66±0,05	0,04	0,005
	Этанол-вода (1:1)	51,3	6,94	6,71±0,02	0,02	0,003
	Этанол	24,3	6,48	6,61±0,04	0,03	0,005
	Пропанол-2	18,3	10,26	10,07±0,05	0,04	0,004
	Ацетон-вода (1:1)	49,6	5,41	5,40±0,05	0,04	0,007
	Ацетон	20,9	6,48	6,76±0,10	0,08	0,012
	МЭК-вода (1:1)	48,3	5,67	5,74±0,07	0,06	0,010
	МЭК	18,4	8,64	8,62±0,07	0,06	0,007
	ДМФА-вода (1:1)	57,5	5,67	5,72±0,11	0,09	0,015
	ДМФА	36,7	6,21	6,50±0,10	0,08	0,012
	Ацетон-толуол (1:1)	11,7	5,67	5,56±0,11	0,09	0,017
	Ацетон-CCl_4 (1:1)	11,6	5,67	5,68±0,12	0,10	0,018
$Cr_2(SO_4)_3$	Вода	78,3	11,92	12,04±0,09	0,07	0,006
	Этанол-вода (1:1)	51,3	5,67	5,77±0,12	0,10	0,018
	Этанол	24,3	9,22	9,18±0,11	0,09	0,010
	Пропанол-2	18,3	6,94	6,96±0,12	0,10	0,015
	Ацетон-вода (1:1)	49,6	6,59	6,58±0,14	0,11	0,017
	Ацетон	20,9	4,77	4,64±0,07	0,06	0,014
	МЭК-вода (1:1)	48,3	4,96	4,80±0,12	0,10	0,022
	МЭК	18,4	6,59	6,68±0,11	0,09	0,014
	ДМФА-вода (1:1)	57,5	6,47	6,58±0,16	0,13	0,019
	ДМФА	36,7	5,46	5,58±0,11	0,09	0,016
	Ацетон-толуол (1:1)	11,7	4,46	4,34±0,20	0,16	0,037
	Ацетон-CCl_4 (1:1)	11,6	4,96	4,80±0,12	0,10	0,022

Как показывают данные табл.1, относительное стандартное отклонение определения падает при увеличении доли неводного растворителя и уменьшении величины диэлектрической проницаемости среды. Исключение составляют смеси ацетона с толуолом и тетрахлоридом углерода. В этих растворителях хотя и величина диэлектрической проницаемости ниже, относительное стандартное отклонение выше. Отсюда следует, что на точность определения оказывает влияние не только природа сопряженного основания (анион) определяемой кислоты и физические свойства растворителя, но и его химическая природа.

Точность определения ионов хрома (III) также зависит от сопряженного основания. Поскольку хлорид-ионы

являются менее сильным основанием, чем сульфаты, точность определения хлоридов хрома выше точности определения сульфатов. Такая же закономерность сохраняется и при титровании ионов цинка в среде смешанных растворителей.

В табл.2 приведены результаты определения хлорида и сульфата цинка в среде различных растворителей.

Результаты потенциометрического определения различных Zn^{2+} в растворителях с разной диэлектрической проницаемостью

(n=5, $\bar{x} \pm \Delta x$, P=0,95) Таблица 2.

Апротонная кислота	Растворитель	ε	Введено, мг	Найдено, мг	S	S_r
$ZnCl_2$	Вода	78,3	15,26	15,24±0,10	0,08	0,005
	Этанол-вода (1:1)	51,3	12,58	12,60±0,16	0,13	0,010
	Этанол	24,3	16,78	16,88±0,07	0,06	0,004
	Пропанол-2	18,3	15,26	15,52±0,12	0,10	0,007
	Ацетон-вода (1:1)	49,6	10,18	10,47±0,11	0,09	0,008
	Ацетон	20,9	13,24	13,09±0,04	0,03	0,002
	МЭК-вода (1:1)	48,3	13,24	13,66±0,07	0,06	0,005
	МЭК	18,4	15,26	15,02±0,12	0,10	0,007
	ДМФА-вода (1:1)	57,5	12,22	11,85±0,12	0,10	0,009
	ДМФА	36,7	13,24	13,53±0,12	0,10	0,007
	Ацетон-CCl_4 (1:1)	11,6	10,18	10,17±0,16	0,13	0,013
	Ацетон-толуол (1:1)	11,7	13,24	13,52±0,16	0,13	0,009
$ZnSO_4$	Вода	78,3	15,20	15,18±0,07	0,06	0,004
	Этанол-вода (1:1)	51,3	16,72	16,97±0,27	0,22	0,013
	Этанол	24,3	16,72	16,91±0,17	0,14	0,008
	Пропанол-2	18,3	10,14	10,86±0,22	0,18	0,017
	Ацетон-вода (1:1)	49,6	13,56	13,70±0,30	0,24	0,018
	Ацетон	20,9	12,16	12,60±0,16	0,13	0,010
	МЭК-вода (1:1)	48,3	14,19	14,70±0,31	0,25	0,017
	МЭК	18,4	15,20	15,30±0,39	0,31	0,020
	ДМФА-вода (1:1)	57,5	15,20	14,99±0,12	0,10	0,007
	ДМФА	36,7	18,31	18,45±0,57	0,46	0,025
	Ацетон-CCl_4 (1:1)	11,6	10,14	10,47±0,16	0,13	0,012
	Ацетон-толуол (1:1)	11,7	12,16	11,95±0,16	0,13	0,011

В целях более глубокого изучения роли аниона на точность определения апротонных кислот проводили титрование также меди (II) не только хлоридов и сульфатов, но и ацетатов, являющимся

более сильными основаниями, чем сульфаты и особенно хлориды.

Результаты потенциометрического определения хлоридов, сульфатов и ацетатов меди (II) в растворителях разной природы

(n=4, $\bar{x} \pm \Delta x$, P=0,95)

Таблица 3.

Растворитель	ε	Апротонная кислота	Введено, мг	Найдено, мг	S	S_r
Вода	78,3	$CuSO_4$	2,46	2,47±0,03	0,02	0,010
		$CuCl_2$	2,54	2,51±0,03	0,02	0,007
		$Cu(CH_3COO)_2$	3,18	3,20±0,08	0,05	0,016
Этанол-вода (19:1)	27,0	$CuSO_4$	2,72	2,73±0,03	0,02	0,007
		$CuCl_2$	2,60	2,55±0,02	0,01	0,005
		$Cu(CH_3COO)_2$	3,10	3,10±0,05	0,03	0,010
Пропанол-2-вода (19:1)	21,3	$CuSO_4$	3,62	3,57±0,03	0,02	0,007
		$CuCl_2$	2,65	2,60±0,02	0,01	0,005
		$Cu(CH_3COO)_2$	3,41	3,55±0,13	0,08	0,023
Пропанол-1-вода (19:1)	23,0	$CuSO_4$	3,22	3,10±0,03	0,02	0,008
		$CuCl_2$	2,65	2,70±0,03	0,02	0,007
		$Cu(CH_3COO)_2$	3,41	3,41±0,06	0,04	0,011
ДМФА-вода (19:1)	38,8	$CuSO_4$	3,22	3,24±0,03	0,02	0,008
		$CuCl_2$	3,20	3,25±0,03	0,02	0,008
		$Cu(CH_3COO)_2$	3,10	3,15±0,06	0,04	0,012
ДМФА-вода (1:1)	57,5	$CuCl_2$	2,65	2,68±0,05	0,03	0,012
		$Cu(CH_3COO)_2$	3,10	3,06±0,06	0,04	0,014

Результаты титрования хлоридов, сульфатов и ацетатов меди (II) в различных растворителях приведены в табл.3. Для анализа взяты как безводные хлориды, так и кристаллгидраты ацетатов.

Как видно из данных табл. 3 точность определения апротонных кислот меди зависит от силы сопряженного основания. При близких количествах хлоридов, сульфатов и ацетатов относительное стандартное отклонение растет при увеличении основности аниона.

Исключение составляют смеси ацетона с толуолом и тетрахлоридом углерода. В этих растворителях хотя и величина диэлектрической проницаемости ниже, относительное стандартное отклонение выше. Отсюда следует, что на

точность определения оказывает влияние не только природа сопряженного основания (анион) определяемой кислоты и физические свойства растворителя, но и его химическая природа.

На основе разработанных методик анализа проводили определение содержания ионов вредных тяжелых металлов в различных пищевых продуктах (мясо, печень, селезенка, молоко, брынза и др.) и других объектах окружающей среды.

ВЫВОДЫ

1. Изучено возможность потенциометрического кислотно-основного определения из перечисленных выше металлов в воде, водно-неводных и смешанных растворах.

2. Полученные данные потенциометрического кислотно-основного титрования водных водно-неводных и смешанных растворов апротонных кислот можно заключить, что исследованные кислоты хорошо титруются растворами гидроксида, этилата, пропилата, изопропилата и ацетата калия при правильно подобранном растворителе. Уменьшение величины диэлектрической проницаемости и константы автопротолиза растворителя улучшает условия потенциометрического титрования, что выражается в увеличении скачка потенциала на кривых титрования.

3. Установлено, что условия кислотно-основного потенциометрического титрования улучшаются при увеличении доли неводного растворителя, когда уменьшается диэлектрическая проницаемость среды.

4. Разработанные методы кислотно-щелочного титриметрического анализа были применены для анализа катионов металлов в различных природных объектах, таких как мясо, молочные продукты, вода, почва и растения.

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TA’LIMDA KOMPETENSIYAVIY YONDASHUV HAMDA UNI TASHKIL ETISHDAGI MUAMMO VA YECHIMLAR

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ANNOTATSIYA

Maqolada kompetensiyaviy yondashuvning ta’lim jarayonini takomillashtirishga, ko‘nikma va malakalarni egallash darajasini oshirishga, shuningdek, ularning mustaqil fikrlash, muammolarni hal qilish va jamoada ishlash qobiliyatlarini rivojlantirishga ta’sir hamda olimlarning kompetensiyaviy yondashuv bo‘yicha olib borgan ishlari, kompetensiyaviy yondashuvni tashkil etishdagi muammolar va ularning yechimlari ko‘rsatiladi.

Kalit so‘zlar: Kompetensiyaviy yondashuv, ta’lim tizimi, ta’lim jarayoni, bilim, ko‘nikma, malaka, mustaqil fikrlash.

KIRISH

XXI asrda globalizatsiya, texnologiya taraqqiyoti va jamiyatning doimiy o‘zgarishi ta’lim tizimiga yangi talablar qo‘ymoqda. Zamonaviy ta’lim tizimi shaxsning bilim, ko‘nikma va qobiliyatlarini rivojlantirish bilan birga, uni hayotning turli sohalarida muvaffaqiyatli ishlashga tayyorlashni maqsad qilgan. Ushbu maqsadga erishishda kompetensiyaviy yondashuv muhim rol o‘ynaydi. Bilamizki ta’lim-tarbiya masalasi necha ming yillik asosga ega bo‘lgan holda, muttasil tarzda zamon talablariga moslashib, fan-texnika yutuqlariga hamohang ravishda takomillashib boradigan jarayon hisoblanadi. Masalan, XX asr oxiri, XXI asr boshida dunyo ilm-fani va amaliyotida kompetensiyaviy yondashuv yuzaga keldi. Bunga sabab, mehnat bozoridagi dinamik o‘zgarishlar, insonning nafaqat bilim va ko‘nikmalari balki, shaxsiy fazilatlariga bo‘lgan talablarning ortishidir. So‘ngi o‘n yillikda ta’lim samaradorligini oshirish borasida olib borilayotgan ishlar tahlili shuni ko‘rsatadiki, aksariyat qilingan ishlar kompetensiya va kompetentlik tushunchalari bilan bog‘liq. Mazkur tushunchalar XX asrning 70-yillarida muomalaga kirib keldi. Bunda, ishbilarmonlik munosabatlarida Amerika Qo‘shma Shtatlarida [1,2] qo‘llanilgan kompetensiya so‘zining mazmuni kasbiy bilim va ko‘nikmalarga qarama-qarshi qo‘yilib, “istalgan kasbiy faoliyatning mustaqil universal tashkil etuvchisi sifatida”

qaralgan. Shunday qilib, kompetensiya muammosi ta'lim sohasiga kirib keldi va vaqt o‘tishi bilan unda etakchi o‘rinni egalladi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Kompetensiyaviy yondashuvning rivojlanish tarixi, asosiy printsiplari va amaliy qo‘llanilishi bo‘yicha xorijiy va mahalliy olimlarning ilmiy ishlari, maqolalar, kitoblar va tadqiqotlar tahlil qilingan. Kompetensiya va kompetentlik tushunchalari ko‘pincha bir-biriga yaqin ma’noda ishlatiladi, ammo ular o‘rtasida farq bor. “Kompetensiya” - bu shaxsning ma’lum bir sohada bilimlar, ko‘nikmalar, qobiliyatlar va qadriyatlarni birlashtirib, amaliy vaziyatlarda muvaffaqiyatli harakat qilish qobiliyatidir. “Kompetentlik” esa kompetensiyaning shaxs tomonidan o‘zlashtirilgan va amalga oshiriladigan darajasini ifodalaydi. Kompetensiya va kompetentlik tushunchalari yuzasidan ko‘plab olimlar, mutaxassislar fikr bildirishgan. Masalan, J.Ravenning 1984-yilda chop etilgan “Zamonaviy jamiyatda kompetentlik” nomli asarida: “U juda ko‘p miqdordagi komponentlardan tashkil topgan bo‘lib, ulardan ko‘pchiligi bir-biriga nisbatan mustaqildir, ayrim komponentlar ko‘proq kognitiv sohaga tegishlidir, boshqalari – emotsional sohaga tegishli. Bu komponentlar o‘z-o‘zini samarali boshqarishda bir-birini to‘ldirishi mumkin” degan fikrni ilgani suradi. XXI asrda ta'lim bo‘yicha xalqaro Yevropa kengashida Jak Delor “Ta’lim: yashirin xazina” nomli dokladida “Ta’lim tayanadigan to‘rtta ustunni” ta’riflab beradi: bular bilishni o‘rganish; bajarishni o‘rganish; birgalikda yashashni o‘rganish; yashashni o‘rganish. Jak Delor fikricha, bajarishni o‘rganish deyilganda, nafaqat kasbiy malakaga ega bo‘lish, balki keng ma'noda kompetent bo‘lish ya’ni, guruhlarda ishlay olish va ish paytida yuzaga keladigan juda ko‘p murakkab vaziyatlardan muvaffaqiyatli chiqib keta olish nazarda tutiladi. Shuni ta’kidlash joizki, “kompetentlik” tushunchasi bilan birgalikda, uning sinonimi sifatida “malakalar bazasi” termini ishlatilgan hollar ham mavjud. B.Oskarson [3] fikriga ko‘ra, ular keng qamrovli, maxsus kasbiy xislatlariga qo‘shimcha ravishda rivojlanadi. Bunday tayanch kompetensiyalar: jamoada samarali ishlash, rejalashtirish, muammolarni echish, ijod qilish, peshqadam bo‘lish, tadbirkorlik, tashkilotchilik va kommunikativ ko‘nikmalarni o‘z ichiga oladi.

2000-yildan boshlab kompetensiyaviy yondashuv kasbiy ta’lim, umumta’lim fanlari standartlari mazmuniga kiritila boshlandi. Hozirda “Yevropa uchun tayanch kompetensiyalar” deb nomlangan Yevropa kengashi simpoziumida belgilangan tayanch kompetensiyalarni keltirib o‘tamiz:

O‘rganishi kerak: tajribadan foydali biror narsani chiqarib olishni, o‘z bilimlari orasidagi o‘zaro aloqani tashkil qilish va

ularni tartiblashtirishni, o‘zining shaxsiy o‘rganish usullarini tashkil qilish (o‘rnatish) hamda muammolarni yecha olishni.

Izlash: mustaqil bilim olish bilan shug‘ullanish, turli ma’lumotlar bazasini izlash, tevarak-atrofni o‘rganish (surishtirish), ekspertdan maslahat olish, zaruriy ma’lumotlar olish, hujjatlar bilan ishlash va ularni turkumlash (klassifikatsiyalash).

O‘ylash: o‘tgan va hozirgi voqealar orasidagi o‘zaro bog‘liqlikni topmoq, jamiyat rivojlanishining u yoki bu aspektiga tanqidiy yondashmoq, murakkablik va o‘ziga bo‘lgan ishonch yo‘qolishiga qarshi turmoq, bahslashuvlarda o‘z pozitsiyasini egallash va shaxsiy nuqtai nazariga ega bo‘lmoq, o‘qiyotgan va ishlayotgan joydagi siyosiy va iqtisodiy muhitning muhimligini anglash, salomatlik, iste’mol qilish, tasviriy san’at va adabiy asarlarni baholay bilish.

Hamkorlik qilish: guruhda ishlash va hamkorlik qila olish, qarorlar qabul qilish, anglashilmovchilik va janjallarni bartaraf etish, kelisha olish, shartnomalarni ishlab chiqish va bajarish.

Ishga kirishish: loyihada qatnashish, javobgarlikni olish, guruhga yoki jamoaga kirish hamda o‘z hissasini qo‘shish. hamkor ekanligini isbotlash, o‘z ishini tashkil qila bilish, hisoblash va modellashtirish asboblaridan foydalana bilish.

Ko‘nikish: yangi axborot va kommunikasiya texnologiyalaridan foydalana olish; tez o‘zgarishlar oldida moslashuvchanligini isbotlash; yangi yechimlarni topa bilish.

Kompetensiyaviy yondashuvning keyingi bosqichi kasbiy ta’lim, umumta’lim fanlari standartlari mazmuniga kiritish bilan bog‘liq bo‘lib, 2006-yil 18 dekabrda Yevropa parlamenti va Kengashi uzluksiz ta’lim uchun quyidagi tayanch kompetensiyalarni tavsiya qildi:

1) O‘z ona tilida muloqat qila olish;

2) Chet tilida muloqat qila olish;

3) Matematik kompetentlik hamda fan va texnika sohasidagi asosiy kompetensiyalar;

4) Raqamli kompetentlik;

5) O‘qishni o‘rganish;

6) Ijtimoiy va fuqarolik kompetensiyasi;

7) Tadbirkorlik va tashabbuskorlik tuyg‘usi;

8) Madaniyatdan xabardor bo‘lish va uni ifodalash.

Qabul qilingan kompetensiyalarda ularning psixologik, metodologik va mazmuniy tomonlari ishlab chiqilgan, tegishli tasviyalar berilgan bo‘lsada, ularga berilgan ta’riflar juda keng va rang-barangligi, shu bilan birga ularning barchasi ham ma’lum yo‘nalishlarni qamrab olganligi bilan ham ahamiyatlidir. Xususan, V.I.Baydenko kompetensiya

tushunchasiga beriladigan ta’rifda ham muammo borligini ko‘rsatadi[4]. Mazkur komponentlar to‘plami insonga maqsadni belgilash, muaffaqiyatli ravishda ularga erishish hamda belgilangan faoliyat sohasida rivojlanish imkonini beradi. Shunga ko‘ra quyidagi xulosaga kelish mumkin. Kompetensiya bu ma’lum soha yoki yo‘nalishdagi tajriba va bilimlar, faoliyatni amalga oshirishga bo‘lgan tayyorlikning namoyon bo‘lishi hamda shaxsning turli nostandart holatlarda muvaffaqiyatli harakat qila olishidir. Kompetensiya tushunchasiga berilgan mazkur ta’rif, shaxsning o‘qish jarayonida egallagan bilim va tajribasini ko‘rsatadi.

A.I.Subetto o‘zining “Kompetensiyaviy yondashuv ontologiyasi va epistemologiyasi klassifikasiyasi va kvalimetriyasi” nomli kitobida[5] Rossiyada olib borilgan tadqiqotlar haqidagi ma’lumotlarida, mazkur an’ana maktab ta’limida asos sifatida olinmaganligi va o‘quv standartlari, dasturlari va h.k.lar amalda qo‘llanilmaganligini ta’kidlaydi. Bundan, kompetensiyaviy yondashuv asosida mustaqil ravishda ta’lim natijalariga erishish konsepsiyasi shakllantirilib, XXI asrdan boshlab o‘z rivojlanishiga erisha boshladi, degan xulosaga kelish mumkin.

O‘zbekistonlik olimlar ham kompetensiyaviy yondashuvni mahalliy kontekstga moslashtirish bo‘yicha muhim tadqiqotlar olib bormoqdalar. To‘raqulov, A., Abdurahmonov, A., Xudoyberganov, B., Qo‘chqorov, A. va boshqa ko‘plab olimlarimiz o‘z tadqiqotlarida O‘zbekiston ta’lim tizimining o‘ziga xos xususiyatlarini, milliy qadriyatlarni va amaliy sharoitlarni hisobga olib, kompetensiyaviy yondashuvni mahalliy kontekstga moslashtirishga harakat qilmoqdalar. Ularning tadqiqotlari nafaqat yurtimizda balki dunyo ta’lim tizimida kompetensiyaviy yondashuvni qo‘llanilishini yaxshilashga qaratilgan.

NATIJALAR VA MUHOKAMA

Kompetensiyaviy yondashuvni qanchalik anglamaylik va tushinib yetmaylik uni amalga oshirishda ba’zi muammolar yuzaga kelaveradi. Ushbu muammolardan ba’zilarini quyida ko‘rib chiqaylik.

- O‘qituvchilarning tayyorgarligi: O‘qituvchilarni kompetensiyaviy yondashuv asosida o‘qitish, yangi pedagogik texnologiyalarni o‘rgatish va ularni qo‘llashga rag‘batlantirish muhim ahamiyatga ega.

- O‘quv dasturlari va o‘quv materiallari: O‘quv dasturlari va o‘quv materiallari kompetensiyaviy yondashuv talablariga mos ravishda qayta ko‘rib chiqilishi kerak.

- Baholash tizimi: O‘quvchilarning kompetensiyalarni o‘zlashtirish darajasini baholash uchun yangi usullarni joriy etish zarur.

- Moddiy-texnik bazasi: O‘quvchilarning amaliy ko‘nikmalarini rivojlantirish uchun zarur bo‘lgan moddiy-texnik bazani yaratish muhim ahamiyatga ega.

- O‘quvchilarning motivatsiyasi: O‘quvchilarni o‘zlashtirgan bilimlarini amaliy vaziyatlarda qo‘llashga, muammolarni hal qilishga va ijod qilishga rag‘batlantirish kerak.

Yuqoridagi muammolar albatta kompetensiyaviy yondashuv asosida ta’lim jarayonini mukammal va sifatli tashkil etishga bir muncha halal beradi. Ushbu muammolarni hal etishga esa biz quyidagicha yechimlarni taklif beramiz:

- O‘qituvchilarni qayta tayyorlash: O‘qituvchilarni kompetensiyaviy yondashuv asosida o‘qitish va ularga yangi pedagogik texnologiyalarni o‘rgatish uchun maxsus dasturlarni ishlab chiqish va amalga oshirish kerak.

- O‘quv dasturlarini qayta ko‘rib chiqish: O‘quv dasturlarini kompetensiyaviy yondashuv talablariga mos ravishda qayta ko‘rib chiqish va o‘quvchilarning kompetensiyalarni rivojlantirishga yo‘naltirilgan o‘quv materiallari va usullarini tanlash kerak.

- Baholash tizimini takomillashtirish: O‘quvchilarning kompetensiyalarni o‘zlashtirish darajasini baholash uchun yangi usullarni joriy etish va baholash tizimini takomillashtirish kerak.

- Moddiy-texnik bazani mustahkamlash: O‘quvchilarning amaliy ko‘nikmalarini rivojlantirish uchun zarur bo‘lgan moddiy-texnik bazani yaratish va mustahkamlash kerak.

- O‘quvchilarning motivatsiyasini oshirish: O‘quvchilarni o‘zlashtirgan bilimlarini amaliy vaziyatlarda qo‘llashga, muammolarni hal qilishga va ijod qilishga rag‘batlantirish uchun turli usullarni qo‘llash kerak.

XULOSA

Kompetensiyaviy yondashuv ta’lim tizimida muhim o‘rin tutadi. Uning samarali amalga oshirilishi uchun o‘qituvchilarning tayyorgarligi, o‘quv dasturlari, baholash tizimi, moddiy-texnik bazasi va o‘quvchilarning motivatsiyasi kabi muammolarni hal qilish zarur. Mahalliy va xorij olimlarning tadqiqotlari va davlat tomonidan qo‘llab-quvvatlash orqali kompetensiyaviy yondashuv ta’lim tizimini yanada sifatli va samarali qilishga yordam beradi.

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THE ROLE OF SCIENTIFIC RESEARCH PRODUCTIVITY IN ENHANCING UNIVERSITY POSITIONS IN GLOBAL RANKINGS

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ABSTRACT

This article presents a meta-analytic synthesis of the literature on the relationship between scientific research productivity and university positions in global rankings. Drawing on bibliometric studies, comparative analyses and reviews published up to 2024, the synthesis quantifies the extent to which research productivity shapes ranking outcomes and examines how this influence varies across ranking systems. The evidence indicates that research productivity is the single largest determinant of ranking position, accounting on average for roughly two thirds of total ranking weight across five major systems and ranging from about one fifth in reputation oriented systems to the entire score in purely bibliometric ones. Citation impact and publication volume emerge as the strongest correlates of ranking position, although the strength of the relationship is highly heterogeneous and is moderated by ranking design, disciplinary mix and size normalization. The synthesis concludes that strengthening research productivity is the most direct lever for improving ranking position, while cautioning against a narrow pursuit of bibliometric quantity at the expense of research quality and institutional mission.

Keywords: research productivity, bibliometric indicators, global university rankings, citations, publications, meta-analysis, scientometrics, higher education.

INTRODUCTION

Global university rankings have become influential instruments of comparison, and most of them assign a substantial share of their weighting to indicators that derive from scientific research. As research output is widely treated as an accessible proxy for knowledge creation and institutional performance, universities increasingly orient their strategies toward improving research productivity in order to climb the rankings [3]. Yet the precise role of research productivity in determining ranking position, and how that role differs across ranking systems, has been studied in fragmented ways. A meta-analytic synthesis is therefore useful to consolidate the quantitative evidence and to clarify how strongly, and under what conditions, research productivity enhances ranking position. The aim of this article is to provide such a synthesis of the literature published up to 2024.

METHODOLOGY

The study follows a meta-analytic synthesis approach. Peer reviewed bibliometric studies, comparative ranking analyses and systematic reviews were considered for inclusion if they examined a quantitative relationship between research productivity indicators (publications, citations, h-

index, collaboration) and university ranking position or score, and if they were published up to 2024. Effect information was extracted as correlation coefficients, indicator weightings and reported shares of variance, and was synthesised narratively and quantitatively. Because the included studies differ in samples, ranking systems and metrics, a random effects logic was adopted, treating heterogeneity as a substantive object of analysis rather than as noise [12]. The synthesis reports the share of ranking weight attributable to research productivity, the direction and strength of reported correlations, and the moderators that explain variation across studies.

RESULTS

The most consistent finding across the literature is that research productivity dominates the weighting of global rankings. A comparative study of the top 300 universities across four systems reported that the share of scientometric parameters ranges from about 20 per cent in the QS system to about 75 per cent in the U.S. News Best Global Universities ranking, with citations, international reputation and the number of researchers being the most important parameters defining ranking position [1]. When the principal systems are placed side by side, the research productivity share rises from roughly one fifth in reputation oriented rankings to the entire score in purely bibliometric ones, as shown in Figure 1.

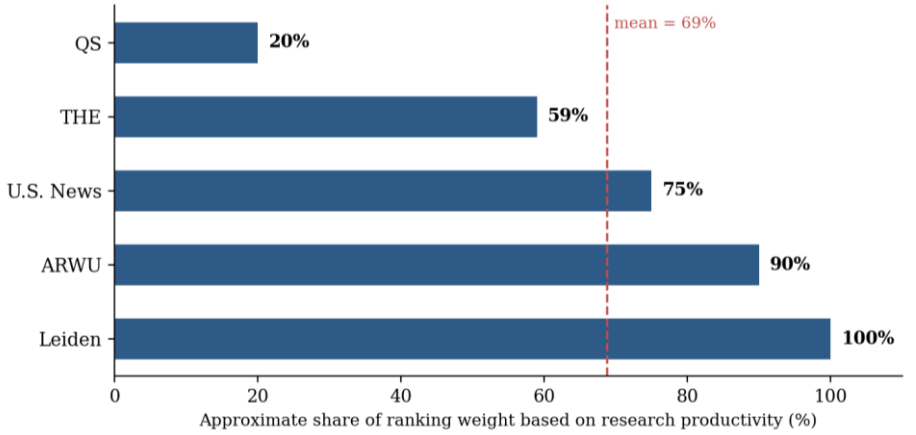


Figure 1. Research productivity as a share of total ranking weight across five major ranking systems (author's synthesis based on published works and [1]).

The second finding concerns the strength of the relationship between research output and ranking position. Comparative correlational analyses report strong rank correlations between publication and citation indicators and ranking position, with coefficients frequently above 0.6 and reaching very high values for predominantly bibliometric systems [4; 7]. Studies focusing on publication characteristics confirm that citation impact, international collaboration and interdisciplinary research are positively associated with higher ranking position [2], and reviews of the field conclude that research output is the central quantitative driver of ranking outcomes [3; 8]. Table 1 summarises the principal studies included in the synthesis and their key quantitative findings.

Table 1. Principal studies included in the meta-analytic synthesis

Study	Scope	Key quantitative finding
Szluka et al., 2023 [1]	Top 300 universities, 4 ranking systems	Scientometric share 20% (QS) to 75% (U.S. News); citations strongest correlate
Li and Yin, 2023 [2]	Top 50 universities, publication analysis	Citation impact, collaboration and interdisciplinarity linked to higher position
Moed, 2017 [4]	5 world ranking systems, correlations	Strong rank correlations among bibliometric indicators (up to 0.96)
Aguillo et al., 2010 [7]	Comparison of major rankings	Moderate to strong correlations between research indicators and rank
Vernon et al., 2018 [8]	Systematic review of ranking and research	Research output is the dominant ranking driver; quality concerns noted

The third finding is that the relationship is highly heterogeneous. The strength of the association between research productivity and ranking position depends on the ranking system, the disciplinary profile of the institution and whether indicators are normalised for size [4; 6; 11]. This heterogeneity is not incidental; it reflects the different ways in which ranking systems convert research output into a score. The pathway through which research productivity translates into ranking position is represented schematically in Figure 2.

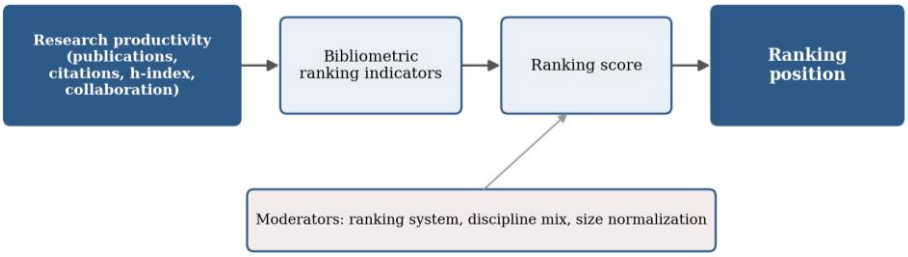


Figure 2. Pathway from research productivity to ranking position, with moderating factors.

DISCUSSION

The synthesis confirms that scientific research productivity is the most direct and most heavily weighted determinant of university position in global rankings. Because citation impact and publication volume carry the largest share of ranking weight in most systems, investment in research capacity, scholarly output and citation visibility is the surest institutional route to ranking improvement [1; 2]. At the same time, the heterogeneity of the relationship carries an important strategic implication: an institution should align its research productivity

strategy with the specific ranking system that matters most to its mission, since the same research effort yields different ranking returns under different methodologies [4; 6].

Several cautions temper this conclusion. First, the dominance of bibliometric indicators creates an incentive to maximise quantity, which can encourage manipulative or low quality publishing and divert attention from teaching and service [3; 9]. Second, bibliometric measures such as the h-index have well documented limitations and should not be treated as complete proxies for research value [11]. Third, size and discipline effects mean that bibliometric rankings can systematically favour large, science intensive institutions, raising questions about what rankings actually measure [5; 6; 10]. For universities in developing and transition systems, including those in our Republic, these findings suggest that research productivity should be strengthened as a genuine capacity rather than pursued as a metric to be gamed.

CONCLUSION

This meta-analytic synthesis has shown that scientific research productivity is the principal determinant of university position in global rankings, accounting on average for roughly two thirds of total ranking weight and acting through citation impact and publication volume. The relationship is strong but heterogeneous, moderated by ranking design, disciplinary mix and size normalization. Universities seeking to enhance their ranking position should therefore prioritise the sustained development of genuine research capacity, while remaining alert to the risk of reducing scholarship to bibliometric quantity. Future research could extend this synthesis with formal pooled effect sizes once a sufficiently homogeneous body of correlational studies becomes available.

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