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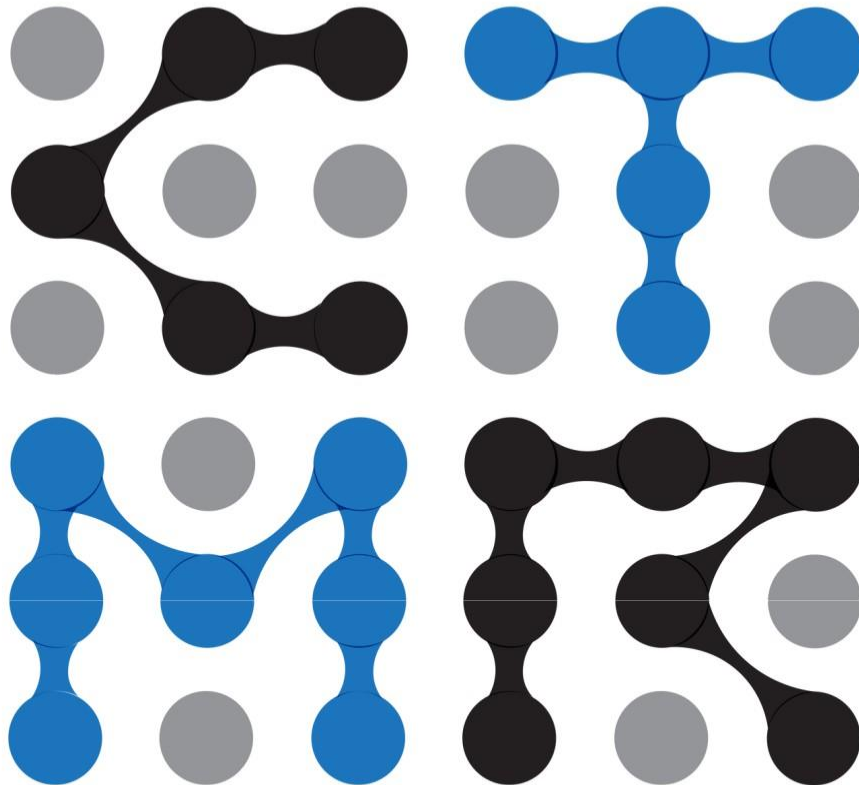
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## SHAXSNING HISSIY- IRODAVIY SOHASI

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## ANNOTATSIYA

Ushbu maqolada kishining o`z hayotida nimalar yuz berayotganiga, nimalarni bilib olayotganiga yoki nima bilan mashg`ul bo`layotganiga nisbatan o`zicha turli xil shaklda bildiradigan kichik munosabat deb ataladigan shaxsning hissiy-irodaviy sohalari, hissiyot, emotsiya, iroda haqida so`z yuritiladi.

**Kalit so`zlar:** hissiyot, emotsiya, iroda, kuchli iroda, kuchsiz iroda, intizomlilik, xarakter xislatlari, irodaning mustaqilligi, shaxs.

## АННОТАЦИЯ

В этой статье мы поговорим об эмоционально-волевой сфере человека, чувствах, эмоциях, воле, которые называются малыми установками, которые выражаются по-разному по отношению к тому, что происходит в его жизни, чему он учится или чему он занят.

**Ключевые слова:** чувство, эмоция, воля, сильная воля, слабая воля, дисциплинированность, черты характера, самостоятельность воли, личность.

## ANNOTATION

This article discusses the emotional-volitional spheres of a person, feelings, emotions, will, which are called small reactions that a person expresses in different ways to what is happening in his life, what he is learning or what he is doing.

**Keywords:** feelings, emotions, will, strong will, weak will, discipline, character traits, independence of will, personality.

**KIRISH.** Odam tashqi muhitdagi turli-tuman narsa va hodisalarni idrok qilari ekan, hech vaqt bu narsalarga batamom befarq bo`lmaydi. Odamning aks ettirish jarayoni doimo faol xarakterga egadir. Aks ettirish jarayoni quyidagilarni qamrab oladi:

- a) shaxsning ehtiyojni qondirish imkoniyatiga egaligini;
- b) qondirishga yordam beradigan yoki qarshilik ko`rsatadigan ob'ektlarga sub'ekt sifatida qatnashishi;
- v) uni harakat qildiruvchi bilimga intiltiruvchi munosabatlar va hokazo.

Chunki odam atrofidagi har turli narsalarni idrok qilib aks ettirar ekan, bu narsalarga nisbatan ma'lum munosabatda bo`ladi. Masalan, bizga ayrim narsalar yoqsa, ya'ni kayfiyatimizni ko`tarib yuborsa, boshqa bir narsalar yoqmaydi va kayfiyatimizni buzib, dilimizni xira qiladi. Ba'zi bir ovqatni odam juda ham yoqtiradi, boshqa bir ovqatni esa mutlaqo ko`rgisi kelmaydi yoki ayrim odamlar bizga xush keladi yoki boshqa bir odamlar esa noxush keladi. Umuman odam atrofidagi hamma narsalarga nisbatan munosabatda bo`ladi va uning munosabatlari ham aks ettiriladi.

Kishilar idrok qilayotgan, ko`rayotgan, eshitayotgan, bajarayotgan, o`ylayotgan, orzu qiladigan narsalarga befarq bo`lmaydilar. Bir xil predmetlar, shaxslar, xarakterlar, voqealar bizni quvontiradi, boshqalari xafa qiladi yana boshqalari g`azab, nafratimizni uyg`otadi. Biz

xavf ostida qolganimizda qo'rquvni his qilamiz, dushman ustidan g'alaba qozonish yoki qiyinchilikni yengish zavq uyg'otadi.

Hissiyot tushunchasiga adabiyotlarda turlicha ta'riflar uchraydi jumladan; A.V.Petrovskiy tahriri ostida chiqqan "Umumiy psixologiya" darsligida hissiyot - kishining o'z hayotida nimalar yuz berayotganiga, nimalarni bilib olayotganiga yoki nima bilan mashg'ul bo'layotganiga nisbatan o'zicha turli xil shaklda bildiradigan kichik munosabatdir. M.Vohidovning "Bolalar psixologiyasi" o'quv qo'llanmasida hissiyot deb - tashqi olamdagi narsa va hodisalarga bo'lgan ichki kechinmalarimizning ongimizda aks ettirilishga aytiladi. Q.Turg'unov muallifligidagi lug'atda hissiyot-shaxsning voqelikdagi narsa va hodisalarga, kishilarga hamda o'z-o'ziga bo'lgan munosabatlarida kelib chiqadigan yoqimli yoki yoqimsiz kechinmalardan iborat. Professor E.G'oziev muallifligidagi "Umumiy psixologiya" darsligida **hissiyot**- odamda, tirik mavjudotlar miyasida, ya'ni shaxslarning ehtiyojlarini qondiruvchi va unga monelik qiluvchi ob'ektlarga nisbatan uning munosabatlarini aks ettirish ma'nosida qo'llaniladi.

Yuqoridagi ta'riflardan ko'rinib turibdiki, hissiyot bizning tuyg'ularimizning o'ziga xos aks ettirish jarayoni bo'lib, bunda narsa va hodisalarni aks ettirish jarayonida bizda tug'iladigan ichki kechinmalar va munosabatlar aks ettiriladi. Demak, hissiyotlar o'z- o'zidan yuzaga kelmasdan, tashqi olamdagi narsa va hodisalarning ta'siri bilan bog'liq ravishda yuzaga keladi.

Adabiyotlarda hissiyot bilan birga emotsiya tushunchasi ham keng doirada qo'llaniladi. Aynan emotsiya tushunchasining mazmuni nimadan iborat va hissiyot tushunchasi bilan o'zaro bog'liqligi qanday degan savol tug'iladi? Shunga muvofiq emotsiya tushunchasining mazmun mohiyatini yoritadigan bo'lsak; jumladan professor E.G.'G'ozievning "Umumiy psixologiya" darsligida emotsiya-odatda tashqi alomatlarini yaqqol namoyon bo'ladigan his-tuyg'ularni, ichki kechinmalarni ifodalanishidan iborat psixik jarayonni yuzaga kelishining aniq shaklidir, deb ta'riflanadi.

**IRODA.** Odam tevarak - atrofdagi narsalarni o'zgartirib o'ziga moslashtirar ekan, yangilik yaratadi, ijod qiladi, shu yangilikni tevarak-atrofdagi voqelikka qo'shadi, voqelikni o'zgartiradi va to'ldiradi. Umuman odam har doim harakat qilmasdan tura olmaydi. Ana shu jihatdan olganda odamning barcha harakatlarini ikki turkumga bo'lish mumkin. Ulardan *birinchisi* ixtiyorsiz harakatlar bo'lsa, *ikkinchisi* ixtiyoriy harakatlardir.

Ixtiyoriy harakatlar iroda bilan bog'liq bo'lgan harakatlardir. Ixtiyoriy harakatlar oldindan belgilangan maqsad asosida to'la ongli ravishda amalga oshiriladigan harakatlardir. Lekin ixtiyoriy harakat deganda, faqat jismoniy harakatlar emas, balki, aqliy harakatlar ham tushuniladi. Shunday qilib, iroda tushunchasiga nisbatan adabiyotlarda turlicha ta'riflar uchraydi. Jumladan, A.V.Petrovskiy darsligida **iroda** - bu kishining o'z oldiga qo'ygan maqsadlariga erishishida qiyinchiliklarni yengib o'tishga qaratilgan faoliyati va xulq-atvorini ongli ravishda tashkil qilishi va o'z-o'zini boshqarishi demakdir, deb ta'riflanadi. Q.Turg'unov muallifligidagi lug'atda ta'riflanishicha, iroda - shaxsning ongli harakatlarida, o'z-o'zini bilishida ifodalanadigan, ayniqsa maqsadga erishish yo'lida uchraydigan jismoniy va ruhiy qiyinchiliklarni yengib chiqishda namoyon bo'ladigan ixtiyoriy faolligidir. M.Vohidov fikricha, iroda deganda biz oldindan belgilagan, qat'iy bir maqsad asosida amalga oshiriladigan va ayrim qiyinchiliklarni, to'siqlarni yengish bilan bog'liq bo'lgan harakatlarni tushunamiz. Professor E.G'.G'ozievning "Umumiy psixologiya " darsligida iroda-bu tashqi va ichki qiyinchiliklarni yengishni talab qiladigan qiliqlarni va harakatlarni inson tomonidan ongli boshqarilishidir, deb

keltiriladi. Umuman olganda iroda shaxs faolligining ko'rinishi hisoblanadi. Shu bois uning yuzaga kelishi bir qator harakatlarni amalga oshirilishi bilan izohlanadi.

Irodaviy harakatlarda har doim maqsad aniq bo'ladi. Odam o'z oldiga qo'ygan maqsadidan kelib chiqadigan natijalarni ham oldindan tasavvur eta oladi. Ana shuning uchun har qanday qiyinchiliklarni yengib bo'lsa ham maqsadini amalga oshirishga intila boradi. Masalan, odam biror imorat solayotgan paytda oxirgi natija qanday bo'lib chiqishini juda yaxshi tasavvur etadi va shuning uchun qanday qiyinchiliklar bo'lsa ham yengib ishni davom ettira beradi. Yoki talaba universitetning birinchi kursiga kirganda qanday mutaxassis bo'lib chiqishini yaxshi biladi va shuning uchun barcha qiyinchiliklarga chidab o'qishni davom ettira beradi.

Umumiy irodaviy faoliyatni yoki alohida akti amalga oshirishning muhim xususiyatlaridan biri amalga oshirilayotgan harakatlarning erkin ekanligini anglashdan iboratdir.

Har bir kishida irodaning ayrim sifatlari umr bo'yi mustahkamlanib, shu odamning xususiy sifatlari (ya'ni doimiy xislatlari) bo'lib qolishi mumkin. Shaxsning bu o'ziga xos xususiyatlari xarakter xislatlari deb ataladi. Har bir kishidagi biron bir irodaviy sifatlarning har qanday namoyon bo'lishi shu kishi xarakterining xislati bo'lavermaydi.

Ayrim hollarda hatto tasodifiy ravishda kishi kuchli iroda ko'rsatishi mumkin, ayrim hollarda mazkur kishining irodasi, umuman kuchli iroda kuchi shu kishi xarakterining xislati ekanligidan dalolat beravermaydi. Bu kishining irodasi kuchli deb aytish uchun uning iroda kuchini bir marta emas, bir necha marotaba namoyon qilganini bilmoq kerak.

Kishining xarakterini ta'riflaganimizda falon kishi dadillik qildi, rost gapirdi demasdan, balki bu odam dadil, rostgo'y, to'g'riso'z deb ataymiz. Buning ma'nosi shuki dadillik va rostgo'ylik, to'g'riso'zlik shu odamning xususiyatlaridir, xarakter xislatlaridir, tegishli sharoitda bu kishi dadillik, rostgo'ylik, to'g'riso'zlik xislatlariga ega ekanligini namoyon qildi deb aytamiz. Kishi xarakterini, xislatlarini bilib olgach, uning biron ish-harakatda qanday yo'l tutishini ancha aniq bilib olamiz, oldindan aytib bera olamiz.

Iroda kuchi va xarakter qat'iyati. Iroda ma'lum kuch bilan yuzaga chiqadi: ba'zi hollarda kishining irodasi kuchli sur'atda namoyon bo'lsa, boshqa hollarda kuchsiz namoyon bo'ladi.

Iroda kuchi irodaning muhim sifatidir. Iroda kuchining turli darajasi irodaviy jarayonning hamma bosqichlarida ko'rinadi. Iroda kuchi avvalo ehtiyojlarni his qilishda va intilishda ko'rinadi, biz kuchli hamda kuchsiz intilishlarni, kuchli hamda kuchsiz hohishlarni farq qilamiz.

Irodaning mustaqilligi. Kishilarning irodaviy harakatlariga ularning mustaqillik darajasiga qarab ham baho beriladi. Irodaviy harakatlarning mustaqilligi kishining avvalo tashabbuskorligida ko'riladi. Tashabbuskorlik biror bir ishni shaxsan boshlab yuborish demakdir. Tashabbuskorlik odatda tevarak-atrofdagi sharoit hamda ijtimoiy hayot talablarini epchillik, mohirlik bilan hisobga olish va ko'pincha kelajakni, yangilikni oldindan ko'ra bilish qobiliyati bilan bir vaqtda namoyon bo'ladi.

Tashabbuskor kishi shaxsiy hayotida ham, ijtimoiy faoliyatida ham vaziyat va turmush talablarini hisobga ola biladi, shu bilan bir vaqtda vazifalarni ilgari suradi, qo'yilgan vazifalarni amalga oshirish uchun yo'l va vositalari tanlaydi va bu vazifalarni hal etishda faol ishtirok etadi. Mustaqillik qilinilmagan va qilinilgan ish-harakatlar uchun javobgarlik sezishda

ko'rinadi. Javobgarlikni sezish ayni harakatlarning to'g'riligiga, maqsadga muvofiq ekanligiga va zarurligiga ishonch hosil qilish demakdir.

Irodaning mustaqilligi yana boshqa kishilarning fikr, maslahat va takliflarini tanqidiy ko'z bilan mulohaza qilib chiqishda ham ko'rinadi. Tanqidiy ko'z bilan mulohaza yuritish xarakter xislati bo'lib, boshqa kishilarning birga maslahat va takliflarini diqqat bilan tahlil qilishda ko'rinadi, xarakterning shu xislati bo'lgan kishi boshqa kishilarning fikr va maslahatlariga e'tibor bilan quloq soladi, ularga muayyan tamoyillar nuqtai nazaridan baho beradi, ijobiy foydali narsani qabul qilib undan foydalanadi, salbiy befoyda narsani dalillar bilan rad etadi.

Ayrim kishilarning iroda mustaqilligi ba'zan qaysarlik kabi maxsus holatda ko'rinadi. Bu holat shundan iboratki, odam boshqa kishilarning aytgan hamma gaplariga, maslahat, iltimoslariga qarshilik ko'rsatadi. qaysarlik qilayotgan odam yo buyurilgan ishni qilmasdan, o'z bilganini qilaveradi yoki buyurilgan ishni teskarisini qiladi.

Intizomlilik - xarakter xislati bo'lib, jamiyat talablariga ongli ravishda o'z ixtiyori bilan bo'ysina bilishda ko'rinadi. Intizomlilik, jumladan, belgilangan tartibga aniq rioya qilishda, olingan va'dani vijdonan bajarishda, o'z burchiga ongli ravishda bo'ysinishda o'z ifodasini topadi.

**XULOSA.** Irodaviy harakatlarda kishining axloqiy xislatlari namoyon bo'lsa, iroda kuchi ijobiy ahamiyatga ega deb hisoblaymiz. Ikkinchidan, kishilarning axloqiy hislarlari haqida fikr yuritilganda aytilgan so'zlarni emas, balki ularning ma'naviy qiyofasini ko'rsatadigan irodaviy harakatlarni nazarda tutamiz. Shuning uchun kuchli irodaning mardlik, o'zini tuta bilish, sabot-matonat, chidam va jasurlik kabi xususiyatlari irodaning axloqiy sifatleri deb hisoblaymiz.

Kishi biror qarorga kelishda o'z qarori va harakatlari uchun axloqiy mas'uliyat sezsa, uning irodasi axloqiy hisoblanadi.

Kishining chinakam axloqiyliigi ma'naviy qiyofasi, so'zida va muhokamalarida emas, balki faoliyatida, ishida va asosan mehnatda, ya'ni mehnatga va ishning o'ziga mehr qo'yishida namoyon bo'ladi.

O'zining intilish (mayllarida), qaror va harakatlarida har doim axloq tamoyillariga amal qiladigan kishilarni axloqli kishilar deb ataymiz.

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**COMPARATIVE EVALUATION OF ORTHOPEDIC TREATMENT OF EDENTIA  
USING DIGITAL TECHNOLOGIES**

**Safarov M. T., Musayeva K. A., Tashpulatova K. M., Safarova N.T., Normurodova R.Z.,  
Buribayeva M. G., Ruzimbetov H. B., Ahmadjonov M. A., Kushbekov B.K.,  
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**Abstract:** Planning and conducting patient rehabilitation is a crucial and responsible stage of dental treatment. Various electronic medical documentation systems have been implemented for successful integration into clinical practice [Martianov I.N. et al.,]. Digital technologies are frequently employed for virtual smile modelling and face design [Aprèsyan et al., 2021; Ryakhovsky et al., 2021; Soas-Ishap et al., 2017; Trunin et al., 2022; Zolotarev et al., 2021]. The authors of the cited works include Ryakhovskiy A.N. et al. (2021), SoasIshap S. et al. (2017), and Oshag B. et al. (2018). According to Bulycheva E., digital analysis allows for a thorough examination of the nature and location of occlusal contacts, which cannot be adequately studied through the use of articulation paper or wax occlusograms.

**Key words:** Orthodontics, Electronic axiography, rheumatoid arthritis, direct joint trauma, morphology.

**INTRODUCTION** The use of digital technologies in orthopedic dentistry allows for working with photographs, X-rays, analyzing occlusal records, virtually moving teeth to demonstrate treatment results, and more. There is a lack of scientific publications comparing the effectiveness of orthopedic constructions made using traditional technologies, 3D printers, and milling tools, despite the widespread implementation of digital technologies in clinical practice. The conflicting opinions on the accuracy of measurements for prosthetics obtained through digital and traditional technologies require further clarification. Specifically, more information is needed on the marginal and internal fit of non-removable prosthetics manufactured using both technologies, the degree of restoration of occlusal relationships, and the impact on the gingival margin and pocket microflora. Aim of the study. Study of the advantages of digital technologies in eliminating partial dental defects and the comparative effectiveness of orthopedic treatment. Objectives of the study. 1. Conducting a comparative analysis of internal and marginal compatibility of artificial bridge-like coverings prepared using traditional and digital technologies. 2. Clinical assessment of the index of loss of occlusal contacts and the effectiveness of correction and use of tooth occlusion in artificial bridge-like coverings prepared using traditional and digital technologies. 3. Analyzing the results of electromyographic and oral cavity microbiological research in the patients of research groups and studying the condition of the subprosthetic mucous membrane using infrared thermometry. 4. Economic justification of the use of orthopedic structures obtained using traditional and digital technologies. 5. Conducting a comparative analysis of the effectiveness of digital technologies in the production of non-removable prostheses.

**METHODS** A comprehensive study was conducted on 150 patients aged 18-75 years with partial removable bridge prostheses, including clinical, functional, and microbiological examinations. Furthermore, a control group of 30 individuals with intact teeth was also

examined. The study participants were divided into three groups, with the first group: comprising of 90 patients with artificial bridge coverings prepared using CAD-CAM technology. The main group was further divided into two subgroups. In subgroup 1, 45 patients were provided with non-removable bridges made of full zirconia that were prepared using digital technologies. This approach was chosen due to its proven effectiveness and reliability. Subgroup 2 will include 45 patients who were placed with non-removable bridges with zirconiumbased porcelain veneers prepared using digital technology. The second, comparison group consists of 60 patients who were placed with non-removable bridgelike veneers made in the traditional way. In turn, the comparison group is divided into two subgroups. In subgroup 1, 30 patients were placed with crushed non-removable bridges; Subgroup 2 will include 30 patients with cast-based non-removable bridges. In the third: control group, 30 people with intact teeth will be recruited. The study's findings and their analysis. A comparative assessment was conducted to evaluate the internal and edge compatibility of artificial bridge-like coverings prepared by different methods. The occlusal contact points' relation and efficiency were then evaluated based on clinical-functional studies of the treatment with artificial bridge-like coverings prepared in different ways.

**Research results:** Completing the collection of material for the dissertation - filling out questionnaires (n:180), studying the dental condition. Making tables for generalization, statistical processing, analysis and description. Development of computer software for mathematical modeling and prediction. Submission of research applications and certification for computer software. Publication of 2 methodological manuals, articles in 4 national and foreign magazines, participation in conferences. Abstract. The obtained results will help not only in the treatment of partial toothlessness with nonremovable bridge prostheses, but also in the testing and treatment of prostheses manufactured using all digital technologies, as well as in the development of additional recommendations for their prediction and treatment in the conditions of implant installation.

**Conclusions:** The method of echosteometry more accurately reflects changes in bone density in periodontitis, since they occur primarily in the spongy bone tissue of the alveolar bone. This is due to the physical characteristics of the ultrasonic vibrations used in echosteometry, namely, their wavelength and, accordingly, the depth of penetration into bone tissue.

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## O‘SMIRLIK DAVRIDA IQTIDOR VA QOBILIYATNING NAMOYON BO‘LISHI

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## ANNOTATSIYA

Ushbu maqolada xatti-harakatlarida suyana boshlaydigan dunyoqarashlarning, ma’naviy e’tiqod, prinsip qoida, idealarining, baholash mulohazalari sistemasining tarkib topishi davri bo‘lmish o‘smir davri haqida hamda o‘smirlik davrida iqtidor va qobilayatning namoyon bo‘lishi haqida so‘z yuritiladi.

**Kalit so‘zlar:** o‘smirlik davri, psixik rivojlanish, biologik rivojlanish, o‘zaro bog‘liqlik, inqiroz, psixofiziologik sabab, o‘z-o‘ziga baho berish, xarakter, qobiliyat, iqtidor.

**РАЗВИТИЕ ТАЛАНТОВ И СПОСОБНОСТЕЙ В ПОДРОСТКОВОМ ПЕРИОДЕ**

## АННОТАЦИЯ

В данной статье говорится о подростковом периоде, который является периодом формирования мировоззрений, нравственных убеждений, принципов, представлений и системы оценочных суждений, которые начинают основываться на поведении, а также о проявлении талантов и способностей в подростковом возрасте. z сохраняется.

**Ключевые слова:** подростковый возраст, психическое развитие, биологическое развитие, взаимозависимость, кризис, психофизиологическая причина, самооценка, характер, способности, талант.

## ANNOTATION

This article discusses adolescence, a period of formation of worldviews, spiritual beliefs, principles, ideas, and a system of evaluation judgments that begin to be based on behavior, and the manifestation of talents and abilities during adolescence.

**Keywords:** adolescence, psychological development, biological development, interdependence, crisis, psychophysiological cause, self-assessment, character, ability, talent.

**KIRISH.** O‘smirlik 10—11 yoshlardan 14—15 yoshlargacha bo‘lgan davrni tashkil etadi. Hozirgi o‘smirlar o‘tmishdoshlariga nisbatan jismoniy, aqliy va siyosiy jihatdan birmuncha ustunlikka ega. Ularda jinsiy yetilish, ijtimoiylashuv jarayoni, psixik o‘sholdinroq namoyon bo‘lmoqda. Aksariyat o‘quvchilarda o‘smirlik yoshiga o‘tish, asosan, 5-sinflardan boshlanadi. “Endi o‘smir bola emas, biroq katta ham emas” ayni shu ta’rif osm‘irlik davrining muhim xarakterini bildiradi. O‘smirlik — bolalikdan kattalikka o‘tish davri bolib, fiziologik va psixologik jihatdan o‘ziga xos xususiyatlari bilan xarakterlanadi. Bu bosqichda bolalarning jismoniy va psixik taraqqiyoti juda tezlashadi, hayotdagi turli narsalarga qiziqishi, yangilikka intilishi ortadi, xakteri shakllanadi, ma’naviy dunyosi boyiydi, ziddiyatlar avj oladi. O‘smirlik balog‘atga yetish davri bolib, yangi hislar, sezgilar va jinsiy hayotga taalluqli chigal masalalarning paydo bolishi bilan ham xarakterlanadi. Bu yoshda o‘smir rivojida keskin o‘zgarishlar ro‘y bera boshlaydi. Bu o‘zgarishlar fiziologik hamda psixologik o‘zgarishlardir. Bo‘yga o‘shish bir tekis bormaydi: qiz-bolalar 5—7 sm o‘ssalar, o‘g‘il bolalar 5—

10 sm o'sadilar. Bo'yiga qarab o'sish paysimon ilk suyaklarning uzunlashishi va umurtqa qismining kattalashishi hisobiga ro'y beradi.

O'smirlik yoshining klassik tadqiqotiga nazar solsak, unda turli xil nazariyalar, farazlar va fundamental izlanishlar borligining guvoni bo'lamiz. O'smirlik yoshiga xos yorqin Psixologik konsepsiyalardan biri XX asrning boshlarida L.S.Vigotskiy (1930) tomonidan yaratilgan madaniy-tarixiy nazariya bo'lib, unda mazkur yosh simptomatikasi, o'smir psixologiyasidagi barqaror va tarixiy o'zgaruvchanlik, uning fenomenlariga oid ilmiy konsepsiyalarning interpretatsiyasi berilgan. L.S.Vigotskiy ta'lim va taraqqiyotning o'zaro masalasini ko'rib chiqdi. Bunda u quyidagi vaziyatni keltirib chiqardi. Bolaga psixik hayotidagi qiyin shakllar muloqot jarayonida shakllanadi, demak muloqot nisbatan tizimlashtirilgan shaklda – o'qitishda rivojlanishni shakllantiradi, yangi psixik ma'lumotlarni vujudga keltiradi, oliy psixik funktsiya takomillashtiriladi. Ta'lim psixikaning shakllanishida muhim rol egallab, uning shakllari esa rivojlanish jarayonida o'zgaradi.

O'smirlik yoshida faqat jismoniy taraqqiyot yuzaga kelmay, balki bolaning shaxsi ham sezilarli rivojlanadi. Bola shaxsining rivojlanishi tevarak-atrofdagi voqealarning ta'siri ortida maktabdagi, ta'lim tarbiya protsessining ta'sirida, kollektiv va tarbiyachilarning g'oyaviy rahbarligi ostida amalga oshadi.

O'smirlik yoshi xatti-harakatlarida suyana boshlaydigan dunyoqarashlarning, ma'naviy e'tiqod, prinsip qoida, idealarining, baholash mulohazalari sistemasining tarkib topishi davridir. Agar kichik maktab yoshidalik davrida u yoki kattalarning, ya'ni o'qituvchilar va ota-onalarning bevosita ko'rsatmalari bilan, yoki o'zining tasodifiy va impulsiv istaklari ta'siri bilan harakat qilgan bo'lsa, endilikda uning uchun o'z xatti-harakatlarining prinsipi, o'zining qarashlari va e'tiqodlari asosiy ahamiyat kasb etadi. O'qituvchi va tarbiyachi shuni nazarda tutishi lozimki, xuddi ana shu yoshda axloqiy ong taraqqiyotiga zamin qo'yiladi.

O'smir turli narsalarni mutlaqo aniq differensiallaydi. Agar tanaffus paytida o'ynab turib stulni sindirib qo'ysa va uni ustaxonada tuzatish lozim bo'lsa, bu jazo emas. Agar o'zining iflos qilgan joyini supurishga majbur qilinsa bu ham jazo emas. Bularning mantiqi o'smir uchun ravshan: bu jazolash emas, balki xatti-harakatlarining natijalarini tuzatishdir.

O'smirlik davrida yetakchi faoliyat shaxsiy intim muloqotdir. O'smirlik davrida yetakchi faoliyat — bu o'qish, muloqot hamda mehnat faoliyatidir. O'smirlik davri muloqotining asosiy vazifasi — bu do'stlik, o'rtoqlikdagi elementar normalarini aniqlash va egallashdir. O'smirlar muloqotining asosiy xususiyati shundan iboratki, u tola o'rtoqlik kodeksiga bo'ysunadi. O'smirlarni o'z tengdoshlari bilan muloqotda bolishi g'oyat katta ahamiyatga egadir. O'smirlar do'stlik, o'rtoqlik va o'zaro yordamlashuvni hamma narsadan yuqori qo'yadilar: ana shunday o'zaro munosabatlar, o'spirinlik yillarida ham davom eta beradi. Bunda o'smirlar va ilk yoshdagi o'spirin o'quvchilarniig xulq-atvorlariga do'stlari ota-onalar va pedagoglarga nisbatan bir necha marta kuchliroq ta'sir etadilar. Buni shu bilan tushuntirish mumkin, o'smir bolaning yetilmaganligi va tajribasizligi uni tevarak-atrofdagi kimsalardan madad axtarishga majbur qiladi. O'smir bolaga uning istaklarini tushunadigan va ularni amalga oshirishga yordam beradigan do'st kerak. O'smirning do'stlari bilan muloqoti ham o'ziga xos xususiyatlarga ega. Tengdosh bolalar bilan prinsipial tenglik holatidagi munosabatlar muhitiga nisbatan o'smirda alohida qiziqish boladi. Bu hoi o'smirda yuzaga keladigan shaxsiy kattalik hissining etik mazmuniga mos keladi. Kattalar bilan muloqotda bolish tengdoshlari bilan bolgan muloqotning o'rnini bosa olmaydi.

**Iqtidor va qobiliyat.** Iqtidor, iste'dod va dahol tushunchalarini ko'rib chiqishdan oldin, unga ma'lum bir faoliyatda muvaffaqiyat qozonish imkoniyatini beradigan turli xil shaxsiy xususiyatlarning kombinatsiyasi bo'lgan juda murakkab ta'lim bilan tanishib chiqishga arziydi. Bu qobiliyatlar. Ular inson uchun muvaffaqiyat kaliti emas. Qobiliyatlar faqat potentsialdir. Haqiqat bo'ladi insonning mehnatsevarligi, qat'iyati va matonatiga bog'liq.

Qobiliyatlar hayotimiz davomida shakllanadi va rivojlanishda davom etadi. Buni balog'at yoshida yoki hatto keksalikda ham ixtiro, adabiyot, rasm va hokazolarda muvaffaqiyatga erishgan odamlar misollari bilan tasdiqlash mumkin.

Qobiliyatlar tabiiy mayllarga asoslanadi, ular insonning tug'ma xislatlari bo'lib, lekin irsiy bo'lishi shart emas. Ular orasida:

- musiqa qulog'i;
- ta'sirli o'pka sig'imi;
- yuqori rang sezgirligi;
- miyaning chap yoki o'ng yarim sharlari faolligining oshishi va hokazo.

"Mobillik", "qobiliyat", "iqtidor", "talant" va "dahol" tushunchalari bir-biri bilan chambarchas bog'liq. Muayyan tabiiy fazilatlar bo'lmasa, insonning muvaffaqiyatga erishishi juda qiyin. Ammo mavjud moyilliklarga qaramay, bunga kafolat berish mumkin emas. Axir, agar inson tizimli ravishda o'rgansa va qattiq mehnat qilsa, ular qobiliyatda rivojlanishi mumkin. Ya'ni, ma'lum bir faoliyat bo'yicha ko'nikmalarga ega bo'lish jarayonida.

Iqtidor tushunchasi bilan bog'liq holda moyillik va qobiliyatlar ikki xil bo'ladi. Ha, ular alohida bo'lishi mumkin. Bunday qobiliyatlar muayyan faoliyat bilan bog'liq bo'lib, unda namoyon bo'ladi. Ular ham keng tarqalgan. Bu qobiliyatlar birinchi navbatda kognitivdir. Ular har qanday faoliyatda zarurdir. Xotirasi zaif yoki aql darajasi past bo'lgan odam, masalan, mavjud bo'lsa ham, bastakor bo'la olmaydi. Musiqa uchun ajoyib quloq. Aynan umumiy qobiliyatlar axborotni olish, qayta ishlash va saqlash samaradorligi va tezligini belgilaydi. Ular, shuningdek, shaxsning atrof-muhit va jamiyat bilan o'zaro munosabatlari samaradorligiga bevosita ta'sir qiladi.

**XULOSA.** Xulosa o'rnida shuni aytish joizki, o'smirlarning jismoniy o'sishi va jinsiy etilishi ularning psixikasida keskin o'zgarishlarni vujudga keltiradi. O'quv fanlarining ko'payishi, axborotlar tarmog'ining kengayishi ularning fikr yuritishini jadallashtiradi. Kichik maktab yoshidagi bolalarda endigina rivojlanish bosqichiga ko'tarilgan intellekt o'smirlik davrida yanada takomillashadi. Ta'lim jarayonida ularda materiallarni tahlil va sintez qilish, muammoning mohiyatini tushunish jadal sur'atlar bilan o'sadi. Tafakkurning rivojlanishi intellektni qo'shimcha ma'lumotlar bilan boyitadi.

O'smirlik yoshining mohiyati shundan iboratki, o'smir birmuncha faolroq ijtimoiy muhitga etilgan bo'lib, bolalik chog'ida vujudga kelgan eski munosabatlarni buzib, ana shu muhit uchun kurasha boshlaydi. Har bir o'smir muvaffaqiyatli ishlar bilan tevarak-atrofdagi odamlar o'rtasida o'z shaxsini tasdiqlashga intiladi. Shuning uchun o'smirlik yoshida iqtidor va qobiliyatning namoyon bo'lishiga alohida e'tibor qaratish va hart-sharoitlar yaratish zarur.

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**JADIDLAR: MAHMUDXO‘JA BEHBUDIY HAYOTI****Jadids: The Life of Mahmud Khoja Behbudi**

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**Oripova Zebo** va **Mamajonova Arofatxon** Ilmiy rahbar: **Keldiyeva Shahnozaa**

**Annotatsiya:** Jadidlar harakati XIX asr oxiri va XX asr boshlarida O‘rta Osiyoda shakllangan islohotchilik harakati bo‘lib, u xalqning ma‘rifati va madaniyatini oshirish, milliy uyg‘onishni rag‘batlantirishga qaratilgan edi. Ushbu harakatning asoschilari Abdurauf Fitrat, Munavvarqori Abdurashidxonov, Mahmudxo‘ja Behbudi kabi ma‘rifatparvarlar edi. Ushbu maqolada jamiyat arbobi sifatida xususiy hisoblangan Mahmudxoja Behbudiyaning O‘zbekiston milliy adabiyotini va tarixini o‘rganishga katta e‘tibor qaratganligi va o‘zining tadqiqotlari bilan uni rivojlantirganligi haqida so‘z yuritiladi.

**Annotation:** The Jadids movement was a reformist movement formed in Central Asia in the late 19th and early 20th centuries, which was aimed at increasing the enlightenment and culture of the people, stimulating national awakening. The founders of this movement were such Enlightenment leaders as Abdurauf Fitrat, Munavvarqori Abdurashidkhanov and Mahmudkhoja Behbudi. This article mentions that Mahmudkhoja Behbudi, considered a private figure of society, paid great attention to the study of national literature and history of Uzbekistan and developed it with his research.

**Kalit so‘zlar:** Dramaturgiya, oyna jurnali, padarkush drammasi, publististika, Borodino jangi, Risolayi jug‘rofiyayi umroniy.

**Keywords:** Dramaturgy, Mirror Journal, Padarkush Drama, Journalism, The Battle of Borodino, Biography of the Booklet.

Mahmudxo‘ja Behbudi 1875-yil 20-yanvarda Samarqand yaqinidagi Baxshitepa qishlog‘ida imom-xatib Behbudxo‘ja Solihxo‘ja o‘g‘li xonadonida tug‘ilgan. Otasi Ahmad Yassaviy avlodidan. Onasi tomonidan bobosi Niyozxo‘ja urganchlik bo‘lib, Samarqandga XVIII asr oxirida, amir Shohmurod hukmronlik davrida ko‘chib kelgan Behbudi dastlab otasidan Qur‘on ilmini o‘rgangan, keyinchalik 6-7 yoshlarida tog‘asi Muhammad Siddiq qo‘lida o‘qib, savod chiqargan. 15 yoshida boshqa bir tog‘asi Mulla Odil o‘zi mudarrislik qilgan madrasada o‘qitib ta‘lim bergan. Behbudiylar oilasi ma‘rifatparvar va ziyoli bo‘lgan. Ikki singlisi ham o‘qib, tahsil olgan. Qur‘onni yaxshi bilgan. Hatto katta singlisi „qoribegim“ unvoniga ega bo‘lgan. Behbudi 18 yoshida Chashmai ob volostida qozi vazifasida ishlagan tog‘asi Muhammad Siddiq qo‘l ostida mirzalik qilgan. Tog‘asi oldida ikki yil ishlagach, mirzalik faoliyatini Kobud volosti qozisi Mulla Zubayr Yaxshiboy o‘g‘li qo‘lida davom ettiradi. Chunki bu paytda tog‘asi qozilikdan bo‘shatilgan. Mirza va qozilik bilan shug‘ullanib, so‘ng Jomboyda muftiylik darajasiga ko‘tarilgan. Behbudi Kabut bo‘lisida 10 desyatina yerga egalik qilgan. O‘ziga to‘q va badavlat kishidir. Behbudi 1899–1900-yillarda buxorolik do‘sti Hoji Baqo bilan birga Makka va Madinada haj safariga otlangan. Shu sababli Rossiya, Arabiston, Misr, Turkiyani kezib chiqqan. Safar jarayonida sayohatning har qanday turi – poyezd, kema, otda va piyoda yurib dunyo kezgan. Sayohat davomida yangi maktab (usuli jadid) ochish fikri mustahkamlanib bordi. 1914-yili ikkinchi marta haj safari chog‘ida Shom, Quddus, Odessa, Istanbul va boshqa shaharlarni kezgan. O‘z sayohati davridagi xotiralarini Samarqandda nashr etilayotgan Oyna jurnalining tahririyatiga yuborib turgan. 1903–1904 yillarda Moskva, Peterburg, Orenburg, Qozon va Qrimda bo‘lgan. Maorif

sohasida Rossiya va tatar arboblari tajribasini o'rgangan. Ismoil Gaspirinskiy bilan uchrashuvi keyingi hayotiga ta'sir katta ko'rsatdi. Behbudiy Samarqand yaqinidagi Halvovi qishlog'ida Ajziy, Rajabaminda Abdulqodir Shakuriylar bilan hamkorlikda yangi maktab ochgan. Behbudiy 1914-yilda „Samarqand“ gazetasini chiqaradi. Gazeta o'zbek va tojik tillarida, haftada 2-marta chop etildi. 45-soni chiqqach, moddiy tanqislik tufayli nashr to'xtadi. Shu yil 20-avgustdan u „Oyna“ jurnali chiqara boshladi. Haftalik, suratli bu jurnal asosan o'zbekcha bo'lib, she'r, maqola (forscha), e'lonlar (ruscha) ham berib borildi. Jurnal Kavkaz, Tatariston, Eron, Afg'oniston, Hindiston, Turkiyagacha tarqaldi. Behbudiy kitob nashrini ham yo'lga qo'yadi. Fitratning „Bayonoti sayyohi hindi“sini ruschaga tarjima qildirib bostirdi (1913). Behbudiy 1914-yil 29-mayda ikkinchi marta Arab mamlakatlariga sayohatga chiqadi. Sayohati davomida Bayramali, Ashxobod, Krasnovodsk, Kislovodsk, Pyatigorsk, Jelesnovodsk, Rostov, Odessa shaharlarida bo'ladi, 8-iyunda Istanbulga keladi. Undan Adarnaga o'tib, yana Istanbulga qaytadi va 20-iyunda Ismoilbek Gaspirinskiy bilan uchrashadi. So'ng Quddus, Bayrut, Yofa, Halil ar-Rahmon, PortSaid, Shom shaharlarida bo'ladi. Sayohat xotiralari „Oyna“ jurnalida bosilib turadi. Bu „xotiralar“ har jihatdan muhim bo'lib, an'anaviy tarix-memuar janrining 20-asr boshidagi o'ziga xos namunasi edi. Muallif unda yo'l taassurotlariga, kishilar bilan uchrashuvlarining ibratli tomonlariga keng o'rin beradi. Qaysi shaharga bormasin, uning tarixi, obidalari, u yerdan chiqqan buyuk zotlar haqida ma'lumotlar to'playdi. Turli-tuman millatlar, ularning urf-udumlari, turmush madaniyati bilan qiziqadi. Ayniqsa, din, e'tiqod masalalariga katta ahamiyat beradi. Behbudiy ijtimoiy-siyosiy ishlarga qizg'in qo'shildi. Aslida bu faoliyat 1906-yildan boshlangan. Shu yili „Rusiya musulmonlari ittifoqi“ning Nijniy Novgorodda o'tkazilgan qurultoyida qatnashgan edi. Toshkentda bo'lib o'tgan (1917) Turkiston musulmonlarining qurultoyida ishtirok etib, nutq so'zladi. U musulmonlar orasidagi har qanday ixtilofga qarshi chiqdi. Behbudiy shu qurultoyda o'lka musulmonlar sho'rosining raisi etib saylandi. 1917-yil 26-noyabrda Behbudiyda Qo'qonda o'lka musulmonlarining 4-favqulodda qurultoyi ish boshladi. 27-noyabrga o'tar kechasi "Turkiston muxtoriyati" e'lon qilindi. Uning g'oyaviy asoschilaridan biri Behbudiy edi. Muxtoriyat sho'rolar tomonidan vahshiyona bostirildi. Behbudiy may oyining boshlarida Samarqandga qaytadi. U yerda ko'p tura olmay Toshkentga keladi. Turkiston sho'rolar hukumati rahbarlari bilan muzokara olib borishga urinadi, ammo natija chiqmaydi.

Dramaturgiya: Behbudiy 1911-yilda „Padarkush“ dramasini yozdi. Bu birinchi o'zbek dramasi edi. 3 parda 4 manzarali bu asar mazmunan sodda bo'lib, o'qimagan, johil va nodon bolaning o'z otasini o'ldirgani haqida edi. Behbudiy bu asar janrini „milliy fojia“ deb atagan. Nashr qilishga chor senzurasini yo'l qo'ymaydi. „Borodino jangi va Rusiyaning fransuzlar bosqinidan xalos bo'lishining 100 yillik yubileyi sanasiga bag'ishlanadi degan vaj bilan Tiflis (Tbilisi) senzurasidan o'tkazadi. Drama 1913-yil bosilib chiqqan, ammo sahnaga qo'yish uchun yana bir yilcha vaqt ketadi. Asar Samarqandda 1914-yil 25-yanvarda sahnaga qo'yildi. Drama xalqqa kuchli ta'sir ko'rsatadi. „Padarkush“ ham janr, ham mazmuniga ko'ra yangi o'zbek adabiyotini boshlab bergan asar bo'ldi. Drama Toshkentda 1914-yil 27-fevralda Avloniy tomonidan qayta sahnalashtiriladi.

Ijtimoiy publitsistika "Oyna" jurnali "Oyna" jurnalida millat va uning haq-huquqiga, tarixiga, til va adabiyot masalalariga, dunyo ahvoliga doir qiziqarli maqolalar, bahslar berib borilgan. Behbudiy millatning taraqqiysi uchun bir necha til bilishni

shart hisobladi. Jurnalning birinchi sonidayoq „Ikki emas, to‘rt til lozim“, degan maqola bilan chiqib, o‘zbek, tojik, arab, rus va hatto biror uzoq xorij (masalan, fransuz) tilini bilish shart deb hisobladi. Ayni paytda tilning muhofazasi („Har millat o‘z tili ila faxr etar 1914, № 35), o‘zaro munosabatlari („Til masalasi“ 1915, № 11,12) haqida muhim va zarur maqolalar chop etdi. Adabiy tanqidga katta e‘tibor berdi. Uning xususiyatlarini belgilashga urindi. Boshqa adabiy janrlar bilan tenghuquqligi masalasini ko‘tardi („Tanqid saralamoqdir“1914, № 27). Millat sha‘nini oyoqosti qiluvchi fikr qarashlarga zarba berib, Turkiston xalqini o‘z nomi bilan atamoq lozimligini talab qilib chiqdi („Sart so‘zi majhuldur“1915, № 22,23,25,26). Behbudiy matbuotimiz tarixida maqolanavis sifatida alohida mavqega ega. Uning hozircha aniqlangan maqolalarining soni 300 ga yetadi. Ular xilma-xil mavzuda. Ilk maqolalaridayoq kommunistik mafkurani keskin rad etgan, „xayoliy“, „bu toifaga qo‘shulmoq biz, musulmonlar uchun nihoyatda zararlik“ deb yozgan edi („Xayrul umuri avsatuho“ – „Ishlarning yaxshisi o‘rtachasidir“, „Xurshid“ gazetasi 1906-yil, 6son). O‘zlikni anglashni muhim biladi. "Qabilasini(ng) ismini va yetti otasining otini bilmaydurgonlarni "qulq „marquq“ derlar", deb yozadi („Sart so‘zi majhuldur“, „Oyna“ jurnali, 1914, № 23). 1917-yilning oxiri 1918-yilning boshlarida jadidlar qurgan ilk demokratik davlatchilik namunasi Turkiston muxtoriyatining taqdiri hal bo‘layotgan bir paytda o‘lka xalqlarini birlikka chaqiradi.

#### Kitoblari

- „Risolayi asbobi savod“ („Savod chiqarish kitobi“, 1904),
- „Risolayi jug‘rofiyayi umroniy“ („Aholi geografiyasiga kirish“, 1905),
- „Muntaxabi jug‘rofiyai umumiy“ („Qisqacha umumiy geografiya“, 1906),
- „Kitobatul atfol“ („Bolalar xati“, 1908),
- „Amaliyoti islom“ (1908),
- „Tarixi islom“ (1909) kabi kitoblar chop ettiradi. Keyinchalik (1908-yilda) Shakuriyning Rajabamindagi maktabini Samarqanddagi o‘z hovlisiga ko‘chirib keltiradi.

Behbudiy kutubxonasi Behbudiyning yurt obodligi yo‘lida boshlagan ijobiy ishlaridan biri „Behbudiya“kutubxonasining tashkil etilishi bo‘ldi. Behbudiy birinchilardan bo‘lib Samarqandda kutubxona faoliyatini yo‘lga qo‘ygan. 1908-yil 11-sentabrda Samarqand hokimining rasmiy ruxsati bilan ushbu kutubxona „Yangi rasta“da ochilgan. Biroq kutubxonaning ochilishi haqidagi xabar biroz avval chop etilgan. Bu haqda „Turkiston viloyatining gazetisi“da xabar berilgan edi. 27 bobdan iborat bo‘lgan dastur kutubxonaning barcha rasmiy masalalarini belgilab bergan. Kutubxonaga yillik a‘zolik badali 3 so‘mni tashkil etgan. Kutubxonaning asosiy maqsadi mahalliy musulmon yoshlari va madrasa talabalarini zamonaviy ilmlar bilan shug‘ullanishga undash bo‘lgan.

Kutubxona faoliyatida Mahmudxo‘ja Behbudiyga jadid ma‘rifatparvarlari Hoji Muin, Vasliy Samarqandiy va pedagog Abduqodir Shakuriy yordam bergan. Tuzilish jihatdan xilma-xil va boy fondga ega bo‘lgan. Chet el davlatlarda nashrdan chiqqan dunyoviy va diniy kitoblar, suratli jurnallar hamda gazetalar, ensiklopediya, lug‘atlar, xarita va atlaslardan o‘qib foydalanish mumkin bo‘lgan. Kutubxonadagi kitoblar fondi dastlab 200, keyinroq 225 jildga yetgan. Kunda 14 soat davomida ishlagan. Ochilishidan 7 oy o‘tib, a‘zolari soni 125 kishiga yetgan. 1910-yillarga kelganda faoliyati so‘na boshladi. Bunga avvalo o‘lkadagi jadidlar va qadimchilar qarama-qarshiligi sabab bo‘lgan. Mullalar ota-onalar bilan suhbatlashib, kofirxona

sifatida u yerga borishni taqiqlab qo'yadi. 1912-yilda sanoqli kishi kutubxonadan foydalangan. 1914-yildan moliyaviy qiyinchiliklar boshlanadi. 15 a'zodan iborat yillik yig'ilish paytida kutubxonani saqlab qolish va iqtisodiy muammoni hal etish maqsadida spektakl qo'yishga kelishib olinadi. Teatr tomoshalari ham qadimchilar tomonidan rad etilgach, Kutubxona faoliyati tugaydi. Behbudiy kutubxonani o'zining uyiga ko'chiradi va Behbudiya kutubxonasi deb nomlaydi. Keyinchalik u yerda chet elda nashr qilingan kitoblarni sotishni ham yo'lga qo'yadi va ularning ro'yxati "Oyna" jurnalida e'lon qilib boriladi.

Vafoti 1919-yilning erta bahorida Mahmudxo'ja Behbudiy o'zi taklif etilgan, Parijda bo'layotgan Versal shartnomasiga qatnashish uchun yo'l oladi. Ammo Shahrizabzda rus ayg'oqchilari tomonidan ushlanadi va o'ldiriladi. Bizga ma'lumki, Versal shartnomasida ruslar taklif etilmaydi. Behbudiyning esa bu xalqaro shartnomada qatnashishi ruslarni sarosimaga solib qo'yan. Shuning uchun ham Behbudiy o'ldirilgan, lekin buni ruslar qilganligi oydinlashsa Turkiston xalqi jumbushga kelishi va bu yomon oqibatlarga olib kelishi aniq edi. Shuning uchun ham ruslar Behbudiyini Buxoro amir Olimxon o'ldirtirdi deya jar solishadi. Allomaning qatl etilgani haqidagi xabar o'sha paytdagi poytaxt Samarqandga rosa bir yildan keyin yetib keladi. Behbudiyning o'limiga bag'ishlab Abdurauf Fitrat „Behbudiyning sag'anasin izladim“ she'rini, Sadriddin Ayniy „Behbudiy Afandini esga tushirib, qatl va qatlgohga xitoban“, „Behbudiy ruhiga ithof“ va Cho'lpon „Mahmudxo'ja Behbudiy xotirasiga“ nomli marsiyalarini yozgan

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## DERIVATIVE AND ITS APPLICATIONS

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**Abstract:** Derivatives are fundamental concepts in calculus, representing the rate at which a function changes with respect to its variables. This article explores the mathematical foundation of derivatives and delves into their diverse applications across various fields such as physics, engineering, economics, and biology. Through a comprehensive literature review and analysis of real-world case studies, the study highlights how derivatives facilitate problem-solving, optimization, and predictive modeling. The findings underscore the versatility and indispensability of derivatives in both theoretical and applied contexts. The article concludes with a discussion on emerging trends and future directions in the study and application of derivatives.

**Keywords:** Derivatives, Calculus, Optimization, Predictive Modeling, Physics, Economics, Engineering

**Introduction:** Derivatives are central to the study of calculus, since they indicate how a function behaves. They were formulated independently by Isaac Newton and Gottfried Wilhelm Leibniz in the late 1600s, and since that time this concept of the derivative has been developed into a tool of strategic importance in several disciplines including science and engineering [1]. Simply put, a derivative signifies the rate of execution of a function with respect to one of its parameters and therefore conveys information concerning areas and properties of that function. Derivatives are also important in mathematics branches which are more than just pure mathematics since they assist in tackling practical situations that include rate of change optimization. For example, in physics, motion and force can be described in terms of derivatives, in economics cost functions and profit maximization can be understood in terms of derivatives. Engineers use derivatives to analyze and design system structure, in addition, biology uses derivatives when considering population growth, as well as biological processes of an organism [2].

Broadly, derivatives form the basis of every optimization algorithm in machine learning and data science efficiency, such as gradient descent which is important when training complex models such as neural networks [3]. In addition, everywhere in financial mathematics, derivatives feature prominently in option pricing as well as risk management, this only goes on to illustrate the range of applicability of derivatives across different fields [4]. Derivatives are essential for new technological developments and scientific breakthroughs. They allow modeling of dynamic systems, optimization of processes, and development of models which can analyze current data and make future predictions [5]. Consequently, derivatives are not only an important aspect of all levels of mathematics education but also one of the most important aspects of applied research and industrial practices. The main goal of this article is to present a systematic treatment of derivatives starting from a pure-mathematical point of view and also

showing the broad scope of their applications. Looking at the literature and practical examples, the paper aims to demonstrate the diversity of applications and the significant role of the derivative in both theory and practice. Moreover, the article provides information on the relevant new developments and future perspectives of derivative research and application including aspects where further studies and development are required [6].

#### **Literature review.**

The study of derivatives has a rich history, rooted in the development of calculus. Newton and Leibniz laid the groundwork for differential calculus, which focuses on derivatives, while integral calculus deals with the accumulation of quantities [1]. Since their inception, derivatives have been extensively studied and applied in numerous fields, evolving alongside advancements in mathematics and technology.

**Mathematical Foundations:** The formal definition of a derivative involves the concept of limits, capturing the instantaneous rate of change of a function at a specific point [7]. This foundational idea allows mathematicians and scientists to analyze the behavior of functions, including their increasing or decreasing trends, concavity, and points of inflection. Higher-order derivatives provide even deeper insights, such as acceleration in physics (the second derivative) and jerk (the third derivative) [8].

**Applications in Physics:** In physics, derivatives are essential for describing motion, forces, and various dynamic systems. Newton's second law of motion,  $F=ma$ , involves acceleration, which is the second derivative of position with respect to time [2]. Additionally, derivatives play a crucial role in electromagnetism, fluid dynamics, and thermodynamics, where they describe changes in fields, flow rates, and energy states [9].

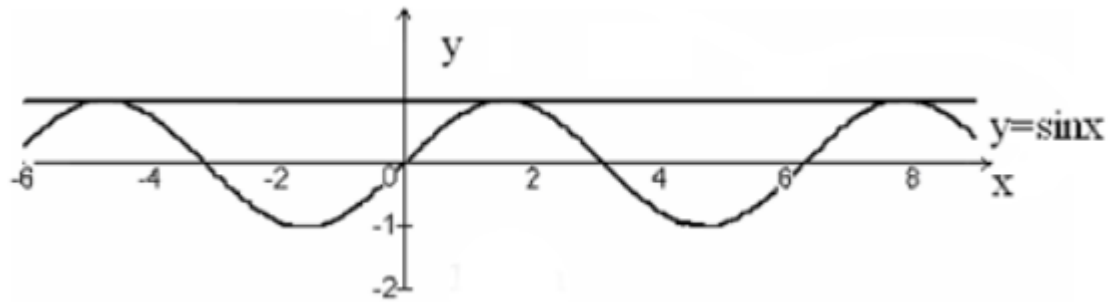
**Engineering Applications:** Engineering disciplines utilize derivatives for system analysis, control theory, and signal processing. In electrical engineering, derivatives help in analyzing circuit behavior and designing filters. Mechanical engineering employs derivatives in kinematics and dynamics to model the motion of machinery and structures [11]. Civil engineering uses derivatives in stress and strain analysis to ensure structural integrity [12].

**Economic Models:** In economics, derivatives play a crucial role in modeling cost functions, revenue, and profit maximization. The concept of marginal cost, which is the derivative of the cost function with respect to production quantity, helps businesses determine optimal production levels. Additionally, derivatives are used in financial mathematics for option pricing and risk management, illustrating their importance in both micro and macroeconomic contexts.

#### **Analysis and Results.**

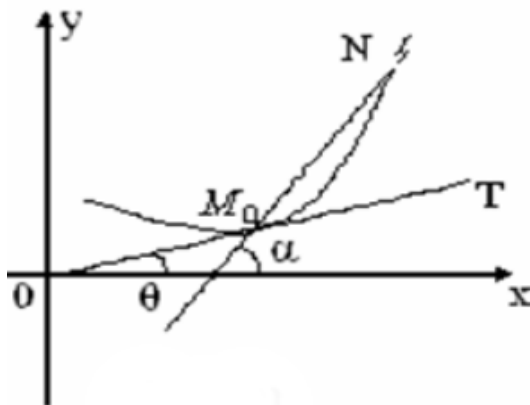
You are familiar with the concept of tangency of a circle. The tangent line to the circle has a single common point with this circle, as well as the circle would be located on one side of the straight line. Now, given an arbitrary curve in the plane, let's look at the issue of how to determine the tangency transferred to it.

The tangent line cannot be defined as a straight line with a curve having a single common point, since, for example  $y=ax^2$  the axis of the parabola has only one common point with the parabola, but does not touch the parabola. The location of the curve on one side of the tangent line is not an important feature, since  $y=ax^3$  touches the curve at the point of the abscissa axis  $(0;0)$ , but the curve crosses this axis at that point. The fact that a tangent line has a single point in common with a curve also cannot be its characteristic.



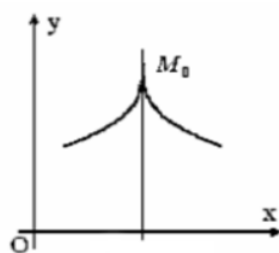
**Figure.1**

For example the straightline  $x=1$  has infinitely many points in common with the sinusoid  $y=\sin x$ , but it attempts a sinusoid. (Figure 1)

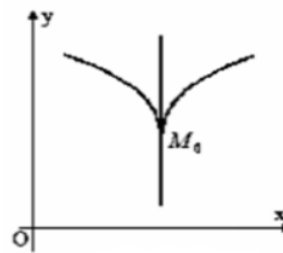


**Figure.2**

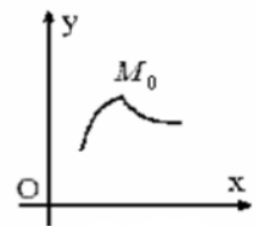
One has to use the concept of limit to give a definition to urina. Suppose  $G$  is an arc of a curve, let  $M_0$  be the point of that curve. By choosing a point  $N$  that belongs to the curve, we pass an  $M_0N$  cutter. If point  $N$  approaches point  $M_0$  along the curve, the  $M_0N$  cutter will turn around point  $M_0$ . It can be the case that as Point  $N$  approaches point  $M_0$ , any  $M_0T$  limit cutting  $M_0N$  can aspire to the situation. In this case, the straight line  $M_0 T$  is called the urination of the curve  $G$  at the point  $M_0$ . (Figure 2)



**Figure.3**



**Figure.4**

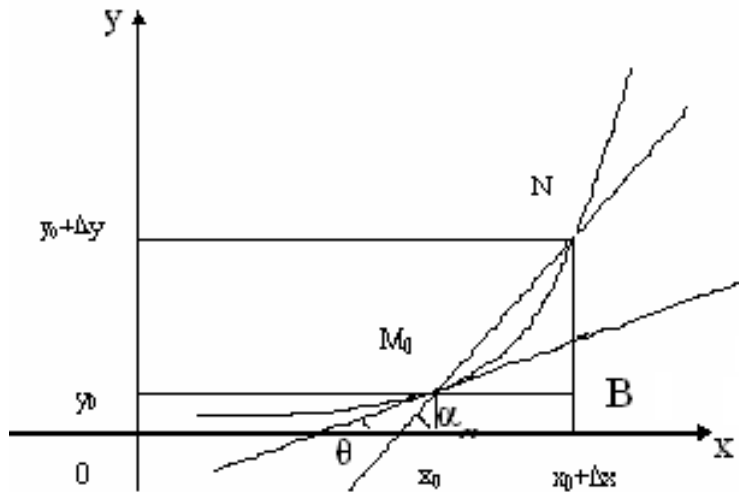


**Figure.5**

If the limit state of the cutter does not exist, then urination at point  $M_0$  is said to be impossible. Such a case is appropriate when point  $M_0$  is the return point of the curve (figures 3,4), or the break (sharpening) Point (Figure 5).

*The question of finding the angular coefficient of a curve attempt. Now let's find the slope coefficient of the urinal, with the curve  $G$  being a graph of a continuous  $y=f(x)$  function*

defined in some interval. Suppose that the graph of the function  $f(x)$  under consideration contains the abscissa  $x_0$  of point  $M_0$  belonging to line  $G$ , The ordinate  $f(x_0)$ , and the urination at this point.



In line  $G$  we take a point  $N(x_0+Dx, f(x_0+Dx))$  different from point  $M_0$  and pass a cutter  $M_0N$ . We denote by its angle, which is formed by the positive direction of the Axis axis (Figure 6). It is clear that angle  $\alpha$  will depend on  $Dx$ :

**Figure.6**

$$\alpha = \alpha(\Delta x) \quad \text{and} \quad \text{tg} \alpha = \frac{BN}{M_0B} = \frac{\Delta y}{\Delta x}.$$

The angle formed by the positive direction of the abscissa axis of the urinal is denoted by  $\theta$ . If  $\theta \neq \pi/2$ , then  $\text{tg} \alpha$  according to the continuity of the function  $k_{urinna} = \text{tg} \theta = \lim_{N \rightarrow M_0} \text{tg} \alpha$ , and  $N$  point  $M_0$  aspiration, considering that  $\Delta x$   $y$  is equally strong to strive for 0,

$$k_{urinna} = \lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} \quad \text{we get equality.}$$

### CONCLUSION

The concept of derivatives appears to be very basic in calculus, however, it has a wide range of applications in many areas. We have covered the history and the principles of derivatives through mathematics and touched their applications in physics, engineering, economics, biology, and machine learning. The detailed case studies done in the analysis have confirmed that derivatives possess superb modeling and optimization capabilities and predictive powers that are greatly needed in increasing understanding and addressing contemporary challenges. Derivatives are quite versatile, for they can be used to model rates of change and to model dynamic systems. It does not matter whether it is modelling the path taken by a thrown body, determining the best way to make things in a factory, reaching the biggest profit in the economy, evaluating the growth in numbers oof people or teaching a computer some things – derivatives can be used to do all this and many more. But it seems that most effective use of derivatives can be made only if one can deal with difficulties associated with the computational burden of derivative constructs and the meaning of derivatives models. These advancements in mathematics of computation and software development still improves our potential to perform derivative applications in more complicated and wide-ranging settings. Further studies ought to be on finding more effective ways of computing complicated derivatives and finding.

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**УЗБЕКИСТАН КАК ЦЕНТР ЗОЛОТОШВЕЙНОГО ИСКУССТВА В  
ЦЕНТРАЛЬНОЙ АЗИИ: ТРАДИЦИИ И ВЛИЯНИЕ**

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**Аннотация.** Золотошвейное искусство, являющееся неотъемлемой частью культурного наследия Центральной Азии, занимает особое место в истории Узбекистана. Это искусство, сочетающее мастерство шитья с использованием золота, на протяжении веков отражало как эстетические предпочтения, так и социально-экономические изменения в регионе. В статье рассматривается эволюция золотошвейного искусства в Узбекистане, его культурные и исторические корни, а также влияние на соседние страны и современную промышленность.

**Ключевые слова:** Узбекистан, золотошвейное искусство, Центральная Азия, традиции, влияние, культура, ремесло, текстиль.

Узбекистан, обладая богатым историко-культурным наследием, по праву считается одним из центров золотошвейного искусства в Центральной Азии. Золотошвейное искусство, или «золотое шитье», представляет собой метод украшения текстильных изделий с помощью золотых и серебряных нитей. Это искусство имеет древние корни и тесно связано с историей ремесел, торговли и культурных обменов на территории Центральной Азии.

В течение веков Узбекистан служил перекрестком цивилизаций, где встречались и взаимодействовали различные культуры и традиции. Рынки и караван-сарай, через которые проходили караваны шелковых и пряных товаров, стали не только центрами торговли, но и места для обмена знаниями и ремесленными навыками, включая искусство золотошвейного дела. В этой статье мы рассматриваем историю и значение золотошвейного искусства в Узбекистане, его эволюцию и влияние на современную культуру.

Золотошвейное искусство в Центральной Азии имеет глубокие исторические корни, уходящие в эпоху Великого шелкового пути. Уже в античные времена в регионе развивались сложные техники текстильного производства, включая вышивку и использование драгоценных материалов. Технология золотого шитья была широко распространена в таких культурах, как персидская, арабская и тюркская, что отразилось в художественных традициях Узбекистана.

В эпоху Тимуридов (XIV-XV века) золотое шитье стало не только предметом роскоши, но и символом высокоразвившихся культурных традиций. В это время мастера из Самарканда, Бухары и Хивы разрабатывали сложные орнаменты, использующие золотые нити для украшения тканей, таких как шелк и бархат. Эти изделия часто использовались для создания роскошных одежд для знати, а также церемониальных тканей, таких как ковры и занавески.

Золотошвейное искусство представляет собой высокотехнологичный и эстетически сложный процесс создания текстильных изделий с использованием золотых или серебряных нитей. Этот вид искусства имеет глубокие исторические корни и развивался в различных культурах, в том числе в Узбекистане, где он приобрел особое

значение и продолжает сохраняться в современности. Важнейшими аспектами золотошвейного искусства являются технологии, используемые для создания узоров и орнаментов, а также особенности обработки материалов.

Основным материалом для золотошвейных работ служат высококачественные ткани, такие как шелк, бархат, тонкий хлопок или шерсть. Ткань должна быть достаточно плотной и прочной, чтобы выдержать нагрузку при вышивке металлическими нитями.

Для самой вышивки используется золото, серебро, а также металлические нити, часто покрытые золотым или серебряным слоем. Эти нити имеют различную толщину, что позволяет создавать разнообразные эффекты и текстуры на ткани. В некоторых случаях применяются и другие драгоценные металлы, такие как медь или латунь.

Кроме того, для создания золотых узоров используются различные вспомогательные материалы, такие как нити из цветных шелков, перламутровые или стеклянные бусины, а также камни и жемчуг для добавления дополнительного блеска и декоративности.

Процесс создания золотошвейного изделия включает несколько ключевых этапов:

**Подготовка основы.** В первую очередь мастер готовит ткань, которая будет использоваться для вышивки. Она может быть предварительно окрашена в нужный цвет и подготовлена для работы. Иногда ткань обрабатывается специальными составами, чтобы она была более устойчивой к повреждениям и обеспечивала лучшее сцепление с золотыми нитями.

**Разработка узора.** На данном этапе создается эскиз или рисунок орнамента, который будет вышиваться. Это может быть традиционный орнамент, символизирующий определенные культуры или природные элементы, либо более сложные композиции, сочиненные с учетом личных предпочтений клиента.

**Вышивка.** На этом этапе начинается процесс непосредственного нанесения золотых нитей на ткань. Для этого используются различные виды стежков и техник, таких как «фрагмент» (плетение нитей по контуру узора), «петля» (создание узоров с помощью повторяющихся стежков) и другие.

Золотые нити могут быть использованы для создания как плоских узоров, так и объемных элементов, добавляя тканям эффект текстуры и глубины. Для более сложных эффектов могут применяться дополнительные техники, такие как использование металлических пайеток, бисера и камней.

**Отделка и финиш.** После того как вышивка завершена, изделие подвергается обработке для придания ему окончательного вида. Этот этап включает обрезку лишних нитей, пришивание декоративных элементов и, если необходимо, нанесение покрытия для усиления долговечности работы. В некоторых случаях изделие может быть дополнительно украшено искусственными или натуральными камнями, жемчугом или кристаллами.

Золотошвейное искусство в Узбекистане имеет несколько уникальных техник и стилей, которые варьируются в зависимости от региона и исторической эпохи:

«Шелковое шитье». Это техника, при которой золотая нить вышивается на шелковой ткани, создавая изысканные орнаменты и узоры. Применяется для создания как мелких декоративных деталей, так и крупных полотен.

«Кумушкори». Это техника, при которой нити из золота или серебра обвивают ткань, создавая уникальный эффект металлизированных узоров. Часто используется для создания контуров фигур, геометрических форм или растительных мотивов.

«Гулдузи». В этой технике золотые нити использовались для создания сложных, многослойных орнаментов, характерных для традиционной узбекской вышивки. Этот стиль получил свое распространение в эпоху Тимуридов и до сих пор сохраняет популярность.

«Сарма». Техника вышивания, при которой золотая нить плетется в сложные узоры, создавая эффект текстурированного рисунка. Особенно популярна в создании обивки для мебели и предметов декора.

Каждое золотошвейное изделие в Узбекистане обладает особой символикой. Узоры, используемые в золотошвейном искусстве, часто имеют глубокое культурное значение и могут рассказывать о религиозных, философских и социальных аспектах жизни общества.

Растительные мотивы — символизируют природу, рост и вечную жизнь. Например, листья, цветы, виноградные лозы часто встречаются в орнаментах, ассоциирующихся с плодородием.

Геометрические фигуры — представляют собой символы гармонии и бесконечности, как в исламском искусстве, где такие узоры часто используются для создания ощущения бесконечности и порядка в мире.

Животные и птицы — могут символизировать различные качества и черты характера, такие как силу (например, орел или лев), мудрость (феникс), любовь и верность (голуби).

Сегодня золотошвейное искусство продолжает развиваться, сохраняя при этом традиции и уникальные методы, заложенные в его основе. Мастера активно экспериментируют с современными технологиями и материалами, создавая новые виды тканей и уникальные дизайны, сочетая традиционные элементы с современными тенденциями моды.

Золотошвейное искусство также популяризируется через выставки, международные ярмарки и мастер-классы, что способствует его сохранению и передаче новым поколениям. Ремесло продолжает играть важную роль в национальной идентичности Узбекистана, а изделия, украшенные золотыми нитями, по-прежнему востребованы как внутри страны, так и за ее пределами.

Таким образом, золотошвейное искусство в Узбекистане — это не только пример высокого мастерства и изысканности, но и важная составляющая культурного наследия региона, которая сохраняет связь с историческими традициями и продолжает влиять на современную культуру.

Золотошвейное искусство в Узбекистане имеет не только эстетическую, но и социальную ценность. В прошлом золотая вышивка являлась символом статуса и богатства. Изделия, украшенные золотыми нитями, носили представители высших слоев общества, а также использовались в храмовых и дворцовых интерьерах. Золотошвейные работы служили важным атрибутом в ритуалах и церемониях, связанных с коронациями, свадебными торжествами и другими важными событиями.

Кроме того, золотое шитье играло ключевую роль в культурном обмене между народами Центральной Азии, Ирана, Индии и Китая. Влияние персидской и индийской

культуры отразилось на узорных композициях, используемых в золотошвейном искусстве Узбекистана, что делает это искусство уникальным и многослойным явлением.

Сегодня золотошвейное искусство в Узбекистане сохраняет свою популярность и продолжает развиваться. Современные мастера используют как традиционные техники, так и новые методы производства. Большое внимание уделяется сохранению исторических традиций, что отражается в обучении молодого поколения и восстановлении старинных технологий.

Мастера золотошвейного искусства работают не только в традиционных центрах, таких как Бухара и Самарканд, но и в крупных городах, таких как Ташкент, где также проводится обучение и поддержка ремесел. Множество современных дизайнеров и художников вдохновляются наследием золотошвейного искусства, создавая новые модные коллекции, украшенные золотыми элементами.

Золотошвейное искусство Узбекистана оказало большое влияние на соседние страны Центральной Азии, включая Казахстан, Киргизию и Туркменистан. В этих странах также развиваются традиции использования золотых нитей в текстильном производстве, что свидетельствует о сохранении культурных и исторических связей в регионе.

Кроме того, узбекские изделия золотошвейного искусства становятся все более популярными на мировом рынке, привлекая внимание коллекционеров и ценителей искусства. Узбекистан активно участвует в международных выставках и ярмарках, демонстрируя свои достижения в области текстильного производства и ремесел.

Заклучение можно сказать что золотошвейное искусство в Узбекистане представляет собой важную и уникальную часть культурного наследия Центральной Азии. С глубокой историей, уходящей корнями в эпоху Великого шелкового пути, это искусство сочетает в себе высокие технологии, художественное мастерство и культурную символику, которая пронизывает все аспекты жизни народа. Использование золотых и серебряных нитей для создания сложных узоров на ткани позволяет не только создавать произведения, поражающие своей красотой и изысканностью, но и передавать важные исторические и культурные послания.

Технологии, используемые в золотошвейном искусстве, продолжают развиваться, с сохранением традиционных методов и внедрением современных инноваций. Мастера золотошвейного дела Узбекистана сохраняют уникальные стили и техники, такие как «гулдузи», «сарма» и «шелковое шитье», которые являются не только предметами роскоши, но и символами культурной идентичности. Эти изделия отражают глубокие философские и религиозные идеи, сохраняют связь с историей и становятся не только частью национального искусства, но и важным вкладом в мировое культурное наследие.

Современное золотошвейное искусство в Узбекистане продолжает активно развиваться, привлекая внимание как на внутреннем, так и на международном уровнях. Влияние этого искусства не ограничивается только национальными границами, оно оказывает заметное воздействие на соседние культуры Центральной Азии и даже на мировой рынок, где изделия из золотых и серебряных нитей ценятся за их уникальность и мастерство.

Таким образом, золотошвейное искусство остается важным культурным наследием Узбекистана, представляя собой не только объект художественного

восхищения, но и живую традицию, способную сохраняться и адаптироваться в условиях современной глобализации.

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**O'ZBEK XALQ MUSIQA IJODIDA USTOZ-SHOGIRD AN'ANALARI**

Buxoro davlat universiteti

Musiqa ijrochiligi va madaniyat kafedrası

12-1 vokal-21-guruh talabasi **Otamurodov Javohir Jamshidovich**

**Annotatsiya:** Ushbu maqolada o'zbek xalq musiqa ijodida ustoz-shogird an'alarining davom ettirish lozimligi, yoshlar ustoz-shogird munosabatlari mezonida yuzaga keladigan bir qator xislatlarni o'zlarida shakllantirib, avlodlardan-avlodlarga ibrat vazifasini o'tashi muhimligi haqida batafsil bayon etilgan.

**Kalit so'zlar:** ustoz-shogird, an'ana, milliy meros, bastakor, katta ashula

O'zbek mumtoz musiqa merosining ulkan madaniy va ma'naviy mohiyati ularning zaminida qaror topgan an'alarida desak adashmagan bo'lamiz. Chunki, mumtoz musiqa o'zining nomi bilan, tarkibiga kasbiy musiqaning shakllanish va rivojlanishi bilan bog'liq barcha an'alarini mujassam etgandir. Xalq bastakorlarining betakror ijodiy merosi va an'analari, qadriyatlarining ijodiy mahsuli sifatida benazir sozanda va xonandalar faoliyatida kamol topib kelgan. An'ana sifatida ardoqlanib avlodlardan-avlodlarga o'tishida esa, ustoz-shogirdlik munosabatlari eng muhim mezon va asosiy omil sifatida xizmat qilib kelgan. Milliy musiqa ijrochilik an'analari va ijodiyoti ustoz-shogird munosabatlari mezonida yuzaga keladigan bir qator xislatlarni o'zida shakllantirib, o'zbekona lutf ila avlodlardan-avlodlarga ibrat sifatida o'tkazib kelayotganligini e'tirof etish lozim. Shulardan biri shogirdningustoziga bo'lgan hurmatidir. Azaldan qadrlanib kelingan ustoz-shogird an'anasi musiqa merosimizni mukammal bo'lishiga asos bo'lgan mezonlardan hisoblanib kelingan. Ustozlarning hikmati ham shunda desak mubolag'a bo'lmas. Bizning zamonamizda xalqimizga namuna bo'lgan ustozlar sanoqli. Ularning har birini ijodi, ijrosi alohida bir dunyo sifatida gavdalangan. An'ana, qadriyat, urf-odatlar har bir xalqning o'zigagina xos milliy xususiyatlarini ifodalovchi omillardir.

Ayni jihatlar inobatga olingan holda, O'zbekistonda an'anaga aylanib qolgan 2019-yilda o'tkazilgan "Sharq taronalari" xalqaro musiqa festivalidan tashqari yana "Maqom", "Baxshichilik", "Folklor" va "Hunarmandchilik" xalqaro festivallari tashkil etildiki, ushbu festivallar yurtimizda muvaffaqiyatli tarzda o'tkazib kelinmoqda. O'tkazilgan festivallarda jahonning yuzdan ortiq mamlakatlaridan turli sohalar bo'yicha rahbarlar, mutaxassislar va mehmonlar ishtirok etdilar. Ko'rinib turibdiki, O'zbekistonda barcha sohalar bo'yicha yaratib berilgan keng imkoniyatlar, yurtimizda mavjud sharoitlar bois shunday nufuzli xalqaro festivallar tantanavor tarzda o'tkazildi va bu jarayonni butun dunyo ahli o'z ko'zi bilan ko'rdi. Bu, albatta, O'zbekistondagi barqaror tinchlik va xotirjamlikning nishonasidir. Yuqorida sanab o'tilgan festivallar natijasida Samarqand-u Buxoroda, Qashqadaryo, Surxondaryoda, Xorazm-u Qoraqalpoq diyorida, Jizzax-u Sirdaryoda go'zal vodiyning qo'shiq va laparlari, xalq amaliy san'ati hamda hunarmandchiligi, umuman aytganda, hududlarning serjilo madaniy hayoti rang-barang chizgilarda gavdalantirilmoqda. O'zbek xalqining urf-odatlari, marosimlari va an'alariga berilayotgan katta e'tibor, ularni tiklash, saqlash va keyingi avlodlarga yetkazish yo'lida samarali sa'y-harakatlar olib borilmoqda. Bu borada "Ustoz-shogird" an'anasining davom ettirilishi yoshlarga saboq berishning o'ziga xos ko'rinishlaridan biridir.

Xalqimizda: “Ustoz ko‘rmagan shogird har maqomga yo‘rg‘alar”,- degan naql bor. Har kasbning o‘z ustalari bo‘lgani kabi ustozlikkasbini avloddan avlodga yetkazuvchi izdoshlar, o‘rinbosarlar, qisqa qilib aytganda, shogirdlarning ham bo‘lishi tabiiy. O‘z kasbining ustasi bo‘lgan ustozlar o‘zlarining bebaho hunarlarini o‘zi bilan olib keta olmasligi barobarida o‘sha hunarni shogirdlariga o‘rgatadi. O‘z navbatida, shogirdlar ham ustozdan o‘rgangan hunarni rivojlantirib, o‘z imkoniyati darajasida keyingi avlod shogirdlarini yetishtirib chiqaradi. Ustoz-shogirdlik bizning milliy an‘analarimizga xosdir. San‘at, xususan, qo‘shiqchilikdagi mazkur an‘ana borasida katta tajribaga egamiz. Ozod diyorumizda shunday ijrochilik maktablari mavjudki, bir-biri- dan go‘zal, bir-biridan zabardast, rang-barangligini ta‘riflashga til ojiz:Ustoz Hojixon Boltayev - shogird Ro‘zmat Jumaniyozov; Ustoz Yunus Rajabiy - shogird Orif Alimahsumov; Ustoz Hoji Abdulaziz Abdurasulov - shogird domla Halim Ibodov; Ustoz Jo‘raxon Sultonov - shogird Ma‘murjon Uzoqov; Ustoz Fattoxon Mamadaliyev – shogird Mahmudjon Tojiboyev; Ustoz Faxriddin Umarov - shogird Hojiakbar Hamidov. Buni yana uzoq davom ettirish mumkin. Ustoz-shogirdlik an‘anasida yana shunday bir qonun mavjudki, ustozlar ijro uslubidagi o‘zlariga ma‘lum sirlarini shogirdlariga o‘rgatmaydilar. Zero shogird o‘z iqtidori, quvvayi-hofizasi ila bu sirni kashf etadi. Aytishlaricha, Ustoz Jo‘raxon Sultonov “Sodirxon ushshog‘i” ashulasini ustoz Sodirxon hofizdan bevosita o‘rganmagan. Balki o‘zbeklarga xos bo‘lgan to‘y-hashamlarda, ustoz ishtirok etadigan davralarda birga bo‘lib, aynan shu qo‘shiq ijrosini sinchkovlik bilan kuzatib, tinglab, “Sodirxon ushshog‘i” ashulasi ijro etilganda butun vujudini quloq qilib o‘rganganligi xususida ibratli hikoyatlar yuradi. Asrlar davomida shakllanib, qaror topib rivojlanib kelgan ustoz-shogirdlik an‘analarining davomchilari bo‘lgan Tavakkal Qodirov va Sultonali Mannopov ustoz-shogird sifatidagi faoliyatlari “San‘atga baxshida umr” deb nomlangan risolada aks ettirilgan. Ushbu risolada Farg‘ona vodiysi ijrochilik maktabining vakillari xususida so‘z yuritiladi. Farg‘ona vodiysi - qadimdan san‘atga shinavanda xalq. Farg‘ona vodiysi san‘atning o‘chog‘i, qaynab turgan bulog‘i hisoblanadi. Farg‘onadan juda ko‘plab san‘atkorlar, xalq e‘tiboriga tushgan xonanda va sozandalar yetishib chiqqan. Ayniqsa, hofizlik borasida so‘z ketganda, Hamroqul qori To‘raqulov, Erka qori Karimov, Boltaboy Rajabov, Mamatbuva Sattorov, Akbar Haydarov, Jo‘raxon Sultonov, Ma‘murjon Uzoqov, Murodjon Ahmedov, Rasulqori Mamadaliyev, Tavakkal Qodirov, Fattohon Mamadaliyev singari ustoz-hofizlar yaratib ketgan Farg‘ona ijrochilik maktabi alohida o‘rin tutadi. Farg‘ona ijrochilik maktabi o‘zgacha bir uslublari va ohanglar jozibadorligi bilan boshqa viloyat ijrochilik maktablaridan ajralib turadi. Farg‘ona vodiysi ijrochilik maktabi qadimdan rivojlanib kelgan. Bu maktabni rivojlantirishda juda ko‘p ustozlarning mehnatlari singgan. Ana shunday ulug‘ ustozlardan biri, bor umrini san‘atga baxshida etgan, “O‘zbekiston bulbuli” degan ulug‘ bir nomga sazovor bo‘lgan, O‘zbekiston xalq artisti Tavakkal Qodirov fikrimizning isbotidir. Qadim zamonlardan buyon to‘ylarda aytiladigan “Yor-yor”, “Yalla”lar ham jamoa bilan, ya‘ni, xor bo‘lib ijro etilgan. Asrlar davomida to‘plangan boy merosimiz “Shashmaqom”ning ashula (vokal) qismidagi taronalar ham ko‘pchilik xonandalar tomonidan jamoa bo‘lib ijro etilgan. Xalq orasida keng tarqalgan “Katta ashula”lar ham ikki, uch va to‘rt kishi bo‘lib ijro qilingan. Bu ijrochilik san‘ati ham jamoaviy ijroning bir ko‘rinishidir. O‘zbek xalqining ko‘p janrli mumtoz musiqa ijodiyotida katta ashula janri alohida, salmoqli o‘rinni egallaydi. U yirik ashula janri bo‘lib, asosan, Farg‘ona vodiysiga xosdir. Katta ashula muxlislar davrasida baland va kuchli ovoza ijro etiladi. Xalq orasida uni “likop ashula”

yoki “likopcha ashula” deb ham atashgan. Katta ashula ijrosida musiqa cholg‘u sozlari jo‘rligidan foydalanilmaydi. Zamonaviy musiqa terminlari bilan aytadigan bo‘lsak, ushbu janrning ayrim jihatlarini vokal-xor ijrosidagi “A-kapella”ga qiyoslash mumkin. Katta ashula mono, duet, trio, kvartet uslubida ko‘proq ijro etiladi. Bu bilan shuni ta’kidlash lozim bo‘ladiki, o‘zbek qo‘shiqchiligi o‘zining ko‘p ming yillik boy tarixiga egadir. Katta ashula janrining o‘ziga xos asosiy jihatlaridan yana biri ushbu janr kuylovchi oldiga juda katta talablarni qo‘yadi. Masalan, qo‘shiq kuylovchi ijro san’atidan puxta bilim va tajribaga ega bo‘lishi, o‘zbek mumtoz she’riyatini yaxshi bilishi, keng diapazonli tiniq va jarangdor ovoz sohibi bo‘lishi, ovozni to‘g‘ri yo‘naltirish maqsadida qo‘lidagi likopchani harakatlantira bilishi va h.k.larni yaxshi o‘zlashtirgan bo‘lishi kerak. Shuning uchun ham katta ashula janriga uncha-muncha qo‘shiqchilar qo‘l ura olmaydilar. Buning boisi shundaki, katta ashular muxlislar ko‘z oldida jonli ijroda kuylanadi va ashaddiy tinglovchilarning olqishlaridan ruhlangan ijrochi ashulaning avj va katta avj qismlarini bir, ikki (ton) parda va undan-da yuqoriroqda kuylab, yonidagi kuylayotgan hamrohini qiynab qo‘ygan ijro holatlarini eslab o‘tish kifoya qiladi. Bu katta ashulaning erkin ijro shakliga kiradi. Ijroning ushbu turi xuddiki askiyachilarning payrovlar aytish jarayonidagi so‘zamolligini namoyish qilish singari kechadi va ovozi kuchli, mohir qo‘shiqchilar muxlislar tomonidan shu yo‘l bilan saralab olingani bizga tariximizdan ma’lum. Bunday ijodiy raqobatlar ijodkorlarni o‘z ustlarida ishlashlariga, o‘z iste’dodlarini maromiga yetkazish maqsadida tinmay izlanishlariga dalda bo‘lgan.

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**MUSIQIY TA'LIM TIZIMIDA YOSH IJROCHILARNI TAYYORLASH  
JARAYONIDA IJROCHILIK AMALIYOTINING O'RNI.**

Buxoro davlat universiteti Musiqa ijrochiligi va madaniyat kafedrasida  
12-1 vokal-21-guruh talabasi **To'xsonov Abdullatif Zavqiddin o'g'li**

**Annotatsiya:** Mazkur maqolada musiqiy ta'lim tizimida yosh ijrochilarni tayyorlash jarayonida ijrochilik amaliyotining o'rni muhim ekanligi haqida bayon etilgan.

**Kalit so'zlar:** musiqiy ta'lim tizimi, ijrochilik an'analari, mumtoz musiqi, qo'shiq, an'anaviy xonandalik.

O'zbek xonandalik san'ati juda qadimiy va serqirraligi bilan Sharq xalqlari madaniyati orasida alohida o'rin tutib kelgan. Uning hozirgi davrga kelib mavqeyi

buyuklashgani, behisob merosga ega bo'lganligining asosiy sababi, bu – uning bevosita xalq ijodiyoti bilan bog'langanligidir. O'zbek xalqining ma'naviyati buyuk,

uning tili va adabiyoti, san'ati, musiqiy merosi bunga yorqin misoldir. Shu bois o'zbek mumtoz musiqi an'anasini, ijrochiligi dunyo miqyosida o'zining buyukligi bilan ajralib turadi. Zero, bu borada yurtboshimizning quyidagi so'zlarini eslab o'tish joizdir: «Barchamizga ayonki, kuy-qo'shiqqa, san'atga muhabbat, musiqi madaniyati xalqimizda bolalikdan boshlab, oila sharoitida shakllanadi. Uyida dutor, doira yoki boshqa cholg'u asbobi bo'lmagan, musiqaning hayotbaxsh ta'sirini o'z hayotida sezmasdan yashaydigan odamni bizning yurtimizda topish qiyin, desak, mubolag'a bo'lmaydi. Eng muhimi, bugungi kunda musiqi san'ati navqiron avlodimizning yuksak ma'naviyat ruhida kamol topishida boshqa san'at turlariga qaraganda ko'proq va kuchliroq ta'sir ko'rsatmoqda». Ayni vaqtda mumtoz musiqaning yoshlar tomonidan munosib o'zlashtirilishi ta'lim jarayonidagi dolzarb masalalardan biriga aylandi. Chunki, uzluksiz ta'lim mezonida barkamol avlodni tarbiyalashda xalqimiz azaliy qadriyatlariga asoslanib, shu bilan birga zamonaviy pedagogik texnologiyalar yordamida yoshlarga singdirilishiga alohida e'tibor qaratilmoqda. An'anaviy musiqani o'zlashtirish mezonini azal-azaldan ustoz-shogird an'anasida amalga oshirib kelingan. Bu jarayonning ham o'ziga xos jihatlari mavjud. Chunki, mukammal va murakkab asarlarni o'zlashtirishda bar qator bosqichlarni bosib o'tish zarur. Bu bosqichlarning har biri bilan muayyan vazifani o'zlashtirishga bag'ishlangan bo'lishi lozim. Musiqiy ta'lim tizimi barkamol avlodning tarbiyasidagi asosiy bosqichda amalga oshirilib, shakllanish bosqichiga qaratilgan bo'ladi. Bu jarayonda yosh ijrochilarni, ustozlarni kasbiy tayyorlash o'ziga xos an'anaviy mezonlar bilan bog'liq bir qator amallarni o'z ichiga oladi. Musiqi ijrochilik san'ati azal-azaldan o'zining sirli dunyosi bilan tinglovchilarni lol qoldirib kelgan. Dunyo so'z tufayli yaralgan bo'lsa, inson jismiga jon musiqi yordamida kirgan. Hadislarda «So'zda sehr bor, she'rda esa hikmat» deb bejiz aytilmagan. Til xalqning borligiga asos bo'lsa, madaniyat uning buyukligidan dalolatdir. Qo'shiq esa madaniyatning bir zarrasi, hayotda uning hamisha o'z o'rni va o'z vazifasi mavjud. Qo'shiq ermak uchun to'qilmaydi, havasga aytilmaydi, aksincha, qo'shiq kishilarni yashashga, kurashga chorlaydi, mehnatga, muhabbatga ruhlantiradi, dard-u-qayg'usiga malham, baxtu-quvonchiga sherik bo'ladi... Qo'shiq xalq orzu-armonlarining ifodasi, ruhiyatining ko'zgusi hisoblanishi shundandir. O'tmishda qo'shiq matnlarini donishmandlar, katta hayot tajribasiga ega bo'lgan ijodkorlar, mashhur shoirlar yozishgan. Insoniyat ma'naviyatini aks ettiradigan go'zal, ma'noli va ta'sirchan so'zlarni tanlab-tanlab

yoʻzishgan. Xalq orasidan chiqqan mohir bastakorlar ularga kuy bastalagan. Xushovoz xonandayu, hofizlar ularni maromiga yetkazib ijro etishgan. Qoʻshiq ana shunday muqaddas, ilohiy bir moʻjiza. Qoʻshiqning taʼriflari ham oʻtmish olimu-fozillari hamda shoirlari tomonidan madh etilgan. Xususan, soʻz sanʼatining sultoni hazrat Alisher Navoiy oʻzlarining «Mahbub ul qulub» asarida qoʻshiq kuylovchilarining taʼrifini keltirib quyidagilarni yozadi: «Koʻngil xush ohangdan quvvat, ruh esa xush ovozdand oziqa oladi. Yoqimli ovozu mahorat bilan kuylaydigan xonandadan dard ahlining oʻti yana alanganadi. Agar goʻzal boʻlsa, hissiyot ahlining oʻrtasida qiyomat koʻtariladi»<sup>2</sup> ...Bu qoʻshiq va xonandalarga berilgan eng munosib taʼrif, desak adashmagan boʻlamiz. Oʻzbek xonandalik sanʼati juda qadimiy va serqirraligi bilan Sharq xalqlari madaniyati orasida alohida oʻrin tutadi. Amaliyot jarayonida oʻzbek xonandaligi turli janrlar va shakllar bilan boyib kelgan. Xonandalik sanʼati xalq va mumtoz yoʻnalishlarda rivojlanganligini eʼtirof etish lozimdir. Xalq yoʻllari qoʻshiqchilik, laparchilik, yallachilik va termachilikka xos boʻlsa, mumtoz yoʻliga maqom va maqom yoʻllariga xos ashulalar, dostonlar, katta ashula-yu suvoralar munosib joy olgan. Bu janrlarning har biri oʻz shakli, ijro imkoniyati va sharoitidan kelib chiqib ijrochilik anʼanalari yuzaga kelgan. Ularni oʻziga xos tarzda, shakliga mos talqin etish chiroyli ovoz, tabiiy isteʼdod, malakali saboqni talab etgan. Oʻtmishdan ustoz sanʼatkorlar kekxa hofizlarning anʼanalarini oʻzlashtirib, ustoz sabogʻi ila kuylab kelgan.

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**“KORXONALAR RAQOBATDOSHLIGINI OSHIRISHDA RAQAMLI TRANSFORMATSIYALARNING O’RNI”**

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**Annotatsiya:** Ushbu maqolada raqamli transformatsiyalar yordamida korxonalarni raqobatdoshligini oshirishdagi roli, ularga oid nazariy-amaliy bilimlar haqida keltirib o’tilgan.

**Kalit so’zlar:** Raqobat, integratsiya, intellektual texnologiya, pirovard, tendensiya, strategiya, inventarizatsiya, funktsional, analog.

**Abstract:** In the article, the role of digital transformations in increasing the competitiveness of enterprises, theoretical and practical knowledge about them is mentioned.

**Key words:** Competition, integration, intelligent technology, bottom line trend, strategy, inventory, functional, analog.

**Kirish:** Korxonaning raqobatbardoshligini keltirib chiqaradigan sabablarni talqin qilish bo'yicha mavjud yondashuvlarni o'rganishimiz ularning ikkita asosiy guruhini ajratib olishga imkon beradi: - birinchi guruh yondashuvlari quyidagilarga asoslanadi: korxonalar raqobatdoshligining paydo bo'lishi ichki xususiyatga ega va dastlab korxonaning tashqi muhit bilan o'zaro ta'siridan mustaqil ravishda unga xosdir. Binobarin, raqobatbardoshlik - bu korxonaning sifat xarakteristikasi (qobiliyati), ya'ni unga xosdir. - yondashuvlarning ikkinchi guruhi quyidagilarga asoslanadi: raqobatbardoshlikning paydo bo'lishining sabablari korxonaga nisbatan tashqi (tizim sifatida ochiqligi va tashqi muhit bilan o'zaro bog'liqligi sababli) va ichki, unga bog'liq emas ochiqlik. Binobarin, raqobatbardoshlik korxonaning xususiyati hisoblanadi va faqat uning raqobatdoshlik (raqobat) shaklida bozorda kontragentlar bilan o'zaro ta'siri natijasida paydo bo'ladi.

Korxonalar raqobatbardoshligi barcha bo'g'inlari (makrodarajada) bir-biri bilan bog'liq. Ulardan birining rivojlanmaganligi boshqalariga salbiy ta'sir ko'rsatadi. Masalan, innovatsion salohiyatni yuqori texnologiyalarni foydalanishga moslashtiruvchi yaxshi rivojlanmagan oliy ta'lim tizimisiz hamda ishlanma va tadqiqotlarni moliyalashtiruvchi samarali amal qiluvchi moliya tizimisiz amalga oshirib bo'lmaydi. Adolatli raqobat shart-sharoitlarining mavjud emasligi va rivojlanmagan tovarlar bozori innovatsion mahsulotga bo'lgan barqaror talabni va ishlab chiqarilayotgan mahsulot sifatini oshirishga raqobatlarini ta'minlamaydi hamda milliy innovatsion tizimlar va infratuzilmalar, ilmiy-texnik ishlanmalarning tijoratlashmaganligi ularni pirovard iste'molchiga etib borishiga imkon bermaydi. O'zbekiston sanoatining rivojlanish xususiyati sanoat tarmoqlarining qayta ishlash sohalarida fond qaytimi va mehnat unumdorligining jadal o'sish tendensiyasiga erishganligi hisoblanadi.

Raqamli transformatsiya analog jarayonlarni raqamligiga aylantirish uchun texnologiyadan foydalanishni anglatadi. Raqamli texnologiyalarga o'tish hayotimizning sun'iy intellektni qo'llaydigan barcha sohalariga ta'sir qildi - intellektual soatdan tortib, uy

yordamchilarigacha. Raqamli transformatsiya mashinali ta'lim, katta ma'lumotlar va Buyumlar Interneti kabi yangi texnologiyalarga bog'liq ravishda o'zgargan. Har qanday brendga raqamli transformatsiya juda zarur vosita hisoblanadi. Har qanday sohaning raqamli texnologiyalarga o'tishiga ko'plab sabablar bor va bu ularning dunyo miqyosiga chishiga turtki bo'lmoqda. Hozirgi vaqtda har qanday startapning biznes strategiyasi dastlab raqamli yondashuvlar asosiga qurilgan, chunki eski jarayonlar yangi biznes modellarga yo'l ochadi. Bu zamonaviy sohalar eski kompaniyalarga ta'sir ko'rsatgan "raqamli zarbalarga qarshi immunitetga ega, shuning uchun yangi ishtirokchilar samaradorligi bo'yicha o'z raqobatchilaridan oldinda turibdi.

Bu shuni anglatadiki, agar soha zamon bilan hamnafas bo'lishni xohlasa, raqamli davr talablariga javob beradigan tarzda ishlash tarzini yangilash kerak. Korxonalarining raqamli transformatsiyasi mamlakatlarga qarab farq qiladi. 2021 yilga ko'ra sohani raqamlashtirish indeksi McKinsey Global Institute indeksiga ko'ra Evropa o'zning raqamli salohiyatining 12%ni bergan bo'lib, Buyuk Britaniya indeksi bo'yicha AQSh bilan 17% bilan teng bo'lib turibdi.

Korxonalar zamonaviy texnologiyalarni qo'llagan holda an'anaviy aloqalarni raqamli aloqa bilan tezda almashtirmoqdalar. O'zgarishlarni qabul qiladigan va moslashuvchan korxonalar muvaffaqiyat qozonish imkoniyatiga ega hisoblanadi. Raqamli ma'lumotlardan samarali foydalanish uchun korxonalar yangi paydo bo'lgan texnologiyalarni sotib olib joylashtirishi, sinovdan o'tkazishi va foydalanishi kerak. Raqamli transformatsiya jarayonining boshida rivojlanish yo'nalishlarini, shuningdek, ushbu rivojlanishga yordam beradigan texnologiyalar majmuini aniqlash juda muhim. Shu bilan birga, korxonalar o'z resurslarining inventarizatsiyasini o'tkazishi, modernizatsiya qilishni talab qiladiganlarni ajratib ko'rsatishi kerak. Raqamli transformatsiyaning muvaffaqiyatli bo'lishida samaradorlikka erishish uchun xodimlar ish jarayonidagi har qanday o'zgarishlarga tayyor bo'lishi kerak.

Raqamlashtirish intellektual texnologiyalarni mavjud biznes jarayonlariga integratsiyalashni talab qiladi. Avval analog hujjatlar va aktivlarni raqamli ma'lumotlarga aylantirish kerak. Keyin jarayonlarni optimallashtirish usullarini topish kerak. Misol uchun, mavjud qurilmalar va mashinalarni Internet tarmog'iga integratsiya qilish uchun ularni shlyuzlar va sensorlar bilan ta'minlash kerak. Boshqa qurilmalar, masalan, virtual reallik apparatlari, mijozlarga xizmat ko'rsatish va inventarizatsiyani boshqarish kabi odamlar tomonidan amalga oshiriladigan jarayonlarni osonlashtirishi mumkin. Biron kompaniya tomonidan ishlatiladigan ERP tizimlari va rejalashtirish tizimlari hal qilinishi kerak bo'lgan vazifalarga mos kelishi kerak. Eng yaxshi ERP yechimlari sun'iy intellekt va kompyuterni o'rganishdan foydalanadi hamda keyingi raqamli transformatsiyani osonlashtiradigan tezkor va kengaytirilgan in-memory ma'lumotlar bazasida (operativ xotirada joylashadigan MB) ishlaydi.

Raqamli transformatsiya zamonaviy korxonaning barcha darajalari va funksional yo'nalishlarini birlashtiradi. Iar korxonalar rivojlanishi uchun zarur bo'lgan muhim vositalarni taqdim etadi. intellektual texnologiyalar korxonalarga faoliyat sohasiga oid murakkab ma'lumotlar to'plamlarini global miqyosda to'plash va tahlil qilishga yordam beradi.

Raqamli ma'lumotlardan samarali foydalanish uchun korxonalar yangi paydo bo'lgan texnologiyalarni sotib olib joylashtirishi, sinovdan o'tkazishi va foydalanishi kerak. Raqamli transformatsiya jarayonining boshida rivojlanish yo'nalishlarini, shuningdek, ushbu rivojlanishga yordam beradigan texnologiyalar majmuini aniqlash juda muhim. Shu bilan birga, korxonalar o'z resurslarining inventarizatsiyasini o'tkazishi, modernizatsiya qilishni talab qiladiganlarni ajratib ko'rsatishi kerak. Bu bosqichda, hatto biznesning yangi ehtiyojlariga

javob beradigan loyihalarni birinchi o'ringa qo'yish, shuningdek, raqamli transformatsiyaga to'sqinlik qilishi mumkin bo'lgan kamchiliklarni aniqlash mumkin. Raqamli transformatsiyaning muvaffaqiyatli bo'lishida samaradorlikka erishish uchun xodimlar ish jarayonidagi har qanday o'zgarishlarga tayyor bo'lishi kerak.

**Xulosa.** Mamlakatimiz taraqqiyotining istiqboli ham raqamli iqtisodiyot rivojlanishi va raqamli texnologiyalarning qamrov darajasiga tayanadi. Bunga erishish uchun raqamli iqtisodiyotni rivojlantirishning quyidagi asosiy shartlari va ustuvor yo'nalishlarini sanab o'tish maqsadga muvofiq: Raqamli texnologiyalar barqaror faoliyat ko'rsatishi uchun institutsional muhit va raqamli infratuzilmani yaratish, davlat xizmatlarini ko'rsatish, iqtisodiyotning real sektori tarmoqlari, sog'liqni saqlash, davlat kadastri va boshqa sohalarda raqamli texnologiyalarni keng joriy etish, shuningdek, O'zbekiston Respublikasi hududini rivojlangan mamlakatlar darajasida internet global tarmog'iga ulanish imkoniyatlari bilan imkon qadar to'liq qoplashni bosqichma-bosqich ta'minlash, aholining keng qatlamlari o'rtasida "raqamli savodxonlik"ni targ'ib qilish va kengaytirish, ularni axborot texnologiyalarini o'zlashtirishga jalb qilish maqsadida o'quv yurtlarida seminar, kurslar va boshqa tadbirlarni o'tkazish, raqamli iqtisodiyot sohasida me'yoriy-huquqiy bazani mustahkamlash va qonunchilik hujjatlarini takomillashtirish, raqamli iqtisodiyot talablariga javob beradigan mehnat bozorini tashkil etish va yangi texnologiyalarni tezkorlik bilan o'zlashtirish uchun mutaxassislar malakasini oshirib borish, innovatsion ishlanmalar bo'yicha zamonaviy ilmiy-ishlab chiqarish laboratoriyalarini tashkil etish. Xalqaro tajriba shundan dalolat bermoqdaki, bugungi kunda raqamli texnologiyalar asosan ilmiy hamjamiyat va xususiy sektorda jadal rivojlanmoqda. Shuning uchun davlat, aynan, ushbu sohalarda innovatsion loyihalar va ITkompaniyalarni qo'llab quvvatlagan holda qulay ekotizimni yaratishi lozim.

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**POSSIBILITIES OF SPECIALIZED FOREIGN LANGUAGE INSTRUCTION  
FOR PROFESSIONALS IN YOUTH GROUPS AND MINISTRIES/AGENCIES  
DURING THE COURSE OF THEIR WORK**

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**Annotation:** This article offers the required ways that older adults working in the private sector and public workers need to effectively study foreign languages in a short amount of time in order to make the most of their careers.

**Keywords:** *foreign languages, methods, youths, workers*

The following level of importance is placed on the ability to speak foreign languages amongst representatives of both the public and private sectors:

- The study of a foreign language fosters more positive views and less prejudice toward others who are different.
- Learning a foreign language will increase your employment opportunities.
- Learning a new culture allows one to meet fresh and intriguing individuals.
- Interacting with another culture allows individuals to get a deeper knowledge of their own.
- Foreign language learning boosts confidence.
- Foreign language classes are frequently cited by graduates as among the most important courses in college due to the communication skills acquired.
- Foreign language proficiency makes international travel more convenient and enjoyable.
- The study of a foreign language improves skills such as problem solving and coping with abstract notions.
- Foreign language learning improves one's employment prospects in government, business, medicine, law, technology, the military, industry, and marketing, among other fields.
- A second language increases your math and English skills, as well as your SAT and GRE scores.
- As pupils learn a second language, their analytical skills improve.
- Foreign languages give a competitive advantage in choosing a career: the ability to communicate in a second language is advantageous.
- Foreign language learning improves hearing and memory abilities.
- A person's participation in a multicultural world is more effective and responsible if they speak another language.
- Foreign language learning provides a cultural and linguistic understanding of the past.
- The study of a foreign language enhances one's understanding of his or her own tongue: English vocabulary abilities improve.

- The study of foreign languages educates and promotes tolerance for different cultures by fostering an appreciation for the relationship between language and human nature.
- Foreign language study broadens one's worldview, broadens one's experiences, and makes one more adaptable and accepting.
- Foreign languages broaden a person's perspective of the world and break down walls between individuals, which promote mistrust and anxiety.
- Studying a foreign language will drastically alter your vacation experience.
- As immigration expands, we must prepare for societal shifts in the United States.
- Being as multilingual as feasible provides a significant edge on the global market.
- Foreign language study is merely a component of a fundamental liberal education: to "educate" is to lead out, out of confinement, narrowness, and darkness.

Foreign language abilities are also advantageous when it comes to making more reasonable judgments, keeping emotional distance, and seizing advantageous possibilities. According to the study "The Foreign Language Effect: Thinking in a Foreign Tongue Reduces Choice Biases," a foreign language provides a mechanism that takes people from their initial intuitive system to a more methodical style of thought. For the study, the researchers collaborated with students who spoke English and had studied Spanish. The experiment, which entailed making a financial choice, was carried out by one set of students in their native language, English, and another group in their foreign language, Spanish. The experiment investigated the likelihood that students would make profitable wagers based on the language in which they viewed their betting alternatives. While the inquiry was done in their home language of English, students thought emotionally and made rash conclusions. In contrast, they made a more logical choice during the Spanish-language exercise. As arguably the most crucial mechanism for this impact, the researchers determined that a foreign language elicits less emotional resonance than the native tongue. It has the advantage that decisions are less influenced by fear and opportunities are more likely to be taken. According to the research paper, the new findings are crucial to how people make judgments in a global society, where more and more individuals utilize a foreign language daily. While making professional or personal financial decisions, the ability to think in a foreign language might be quite advantageous.

### **Foreign languages as a determinant in the development of the global economy**

In its IW Future Panel, the Institut der Deutschen Wirtschaft (Institute of the German Economics) likewise asserts that foreign language proficiency is a crucial economic success element. Traditional industrial sectors may only achieve success if they can withstand structural change brought about by megatrends such as globalization and the intensification of knowledge. Communication is the foundation of globalization and the deepening of knowledge; it must operate well across international borders for both processes to be successful. So, it is vital to have knowledge of different languages and cultures. We do not dispute, for instance, that translation software might be utilized as a first assist while composing business communications. They do not, however, render the study of languages unnecessary. Even programs marketed as employing artificial intelligence are mostly suited for translating factual content. For instance, they do not comprehend emotions, which might lead to awkward misunderstandings. You require linguistic abilities to be able to verify translations. Translation applications are a disruptive influence in oral business communication, as is obvious to anybody. First speaking or typing into the app, then hearing to or reading out the translation before the

other person answers in kind — talks quickly take three times longer. Not to add that this attitude is not exemplary of professionalism. Only those who can effectively communicate themselves while being cognizant of cultural differences can achieve their objective and grow professionally and emotionally, whether as a team member or leader. Learning a second language also fosters soft skills such as empathy, which are essential for strong employee interactions, tolerance, and respect, and increases flexibility to new workplace cultures.

Linguistic competencies so important for careers. There is no longer a requirement for professional skills for everyone seeking a career today. In recent years, soft skills such as general communication skills, networking, cultural awareness, and presenting abilities have grown increasingly valuable. Nevertheless, there are vital skills such as digital capabilities. In the context of a worldwide economy, the willingness to pursue an international career is also desirable, and participation in relevant continuing education programs, such as company language classes, is encouraged.

In order for civil servants to learn the language effectively in a short period of time, the following methods should be used :

- 1. Start with short, simple dialogues
- 2. Focus on comprehensible input
- 3. Study pronunciation very early on
- 4. Read wisely, not widely
- 5. Start speaking early
- 6. Immerse yourself in the language
- 7. Learn one language at a time
- 8. Focus on real concentrated study... not cheap hacks
- 9. Turn off the subtitles when watching TV
- 10. Have a strong “Tolerance for ambiguity”

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**ЖАРРОХЛИК АМАЛИЁТИДАН КЕЙИНГИ АСОРАТЛАНГАН ВА АСОРАТЛАНМАНГАН ЧУРРАЛАР.****А.А.Ражапов., Р.Х.Каримов., Ш.Э.Жумабаев. А.Ж.Бекчанов.**

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**Муаммонинг долзарблиги:** Умуман олганда, чурра ҳосил бўлишининг маҳаллий ва умумий сабаблари мавжуд. Маҳаллий сабабларга қорин деворидаги бўш, «нуқсонга эга бўлган жойлар» киради: киндик ҳалқаси, қорин орти чизиғи, спигел чизиғи, Пти ва Гринфельд учбурчаги чов ва сон каналлари киради. Умумий сабабларга ирсий омиллар (20-25%), беморнинг ёши (20-40 ёш орасида), жинси (80%- 90% эркаклар касалланади), спланхноптоз (ички аъзоларнинг паст жойлашиши), ориқлаб кетиш, қорин мушакларининг кучсизлиги, қорин бўшлиғи ичидаги босимнинг ошиши, сурункали йўтал, простата аденомаси, туғиш жараёни, қабзият, ич кетиш, қорин бўшлиғидаги босимни оширувчи чолғу асбобларини чалиш киради.

**Ишнинг мақсади:** ишнинг мақсади сифатида 2024 йил давомида РШТЎИАМ Хоразм филиалига мурожаат қилган беморларнинг анамнестик тахлили, касаллик тарихлари ўрганилди.

**Материал ва усуллар:** ишнинг материали сифатида 2024 йил давомида РШТЎИАМ Хоразм филиали жаррохлик бўлимига мурожаат қилиб, жаррохлик бўлимида жаррохлик амалиётдан кейинги асоратланган ва асоратланманган чурралар ташхиси билан даволанган беморлардан биопсия материаллари олиниб Хоразм вилояти патологик анатомия бюросида гистологик препаратлар тайёрланиб текширилди.

**Олинган натижалар:** 2024 йил давомида РШТЎИАМ Хоразм филиали жаррохлик бўлимига мурожаат қилиб, жаррохлик бўлимида жаррохлик амалиётдан кейинги асоратланган ва асоратланманган чурралар ташхиси билан даволанган жами 80 нафар беморлардан олинган биопсия материаллари текшириб кўрилганда шундан, 40 нафари аёл жинсили ва 20 нафари эркак жинсли беморлар бўлиб, тайёрланган гистологик препаратлар микроскоп остида текшириб кўрилди ва аниқ ташхис қўйилди.

**Хулосалар:** хулоса ўрнида шуни айтиш мумкинки, жаррохлик амалиётдан кейинги асоратланган ва асоратланманган чурралар келиб чиқиш сабабли турли хил бўлиб, чурра касаллиги ичида чов чурралари ташхиси эркакларга қараганда аёллар кўп учраган.

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## MIKROELEMENTLAR VA ULARNING FIZIOLOGIK AHAMIYATI

Fozilov Sherzod

Ne'matova Maftuna Maqsad qizi  
Ibrohimova Jumagul Qayumjon qizi

**Annotatsiya:** Mikroelementlar o'simliklarning hayotiy jarayonlarida muhim ahamiyatga ega bo'lgan mineral moddalar guruhini tashkil qiladi. Ushbu maqola o'simliklarning o'sishi, rivojlanishi va metabolik jarayonlarida mikroelementlarning fiziologik rolini yoritib beradi. Mikroelementlarning tuproqdagi mavjudligi, o'simlikka singishi va biologik faolligiga e'tibor qaratiladi. Xususan, temir, rux, bor, marganets, mis, molibden va xlor kabi mikroelementlarning fermentativ reaksiyalar, fotosintez, nafas olish, hujayra devori shakllanishi va o'simliklarning stressga qarshi chidamliligida tutgan o'rni muhokama qilinadi. Maqolada mikroelement yetishmovchiligining o'simlik salomatligiga salbiy ta'siri va bu muammoni bartaraf etish uchun zamonaviy qishloq xo'jaligi texnologiyalari taklif qilinadi.

**Kalit so'zlar:** Mikroelementlar, o'simlik fiziologiyasi, tuproq unumdorligi, temir, rux, bor, marganets, fotosintez, fermentativ reaksiyalar, stress chidamliligi.

O'simliklar hayotiy faoliyatining asosiy jarayonlari, jumladan fotosintez, nafas olish, hujayra bo'linishi va o'sish, mikroelementlar kabi mineral moddalar ishtirokisiz to'liq amalga oshmaydi. Mikroelementlar — bu tuproq tarkibida juda kam miqdorda uchraydigan, ammo o'simliklarning fiziologik jarayonlari uchun zarur bo'lgan kimyoviy elementlardir. Temir (Fe), rux (Zn), bor (B), marganets (Mn), mis (Cu), molibden (Mo) va xlor (Cl) kabi mikroelementlar o'simliklar hayotiy tizimida katalizator sifatida ishtirok etadi va metabolik jarayonlarning samaradorligini ta'minlaydi.

Dunyo bo'ylab olib borilgan tadqiqotlar shuni ko'rsatmoqdaki, tuproqdagi mikroelementlar miqdori o'simliklar hosildorligining 10-50% oralig'ida o'zgarishiga sabab bo'lishi mumkin. Masalan, bor yetishmovchiligi meva va sabzavotlarda gul changi sifatini pasaytirib, hosildorlikni 30% gacha kamaytiradi. Ruxning yetishmasligi esa donli ekinlarda o'sish va rivojlanish jarayonlarini sekinlashtiradi.

O'simliklarning mikroelementlarga bo'lgan ehtiyojini to'g'ri aniqlash va ulardan samarali foydalanish tuproq unumdorligini oshirish, hosildorlikni ko'paytirish va ekinlar salomatligini yaxshilash uchun dolzarb masaladir. Ushbu maqolada mikroelementlarning o'simliklar fiziologiyasidagi roli, ularning tuproqdan o'zlashtirilishi va yetishmovchilik natijasida yuzaga keluvchi muammolar tahlil qilinadi. Shuningdek, zamonaviy qishloq xo'jaligida mikroelementlardan foydalanishning samaradorligi muhokama qilinadi.

Mikroelementlar o'simliklarning normal rivojlanishi va hayotiy faoliyatida hal qiluvchi rol o'ynaydi. Ular fotosintez, nafas olish, azot o'zlashtirish, fermentativ reaksiyalar va hujayra bo'linishi kabi jarayonlarda ishtirok etadi. Quyida asosiy mikroelementlarning o'simliklar uchun ahamiyati ko'rib chiqiladi:

1. Temir (Fe):

Temir xlorofill sintezi, fotosintez va nafas olish jarayonlari uchun muhim. U sitoxrom va boshqa fermentlar tarkibiy qismi hisoblanadi. Temir yetishmovchiligi o'simlik barglarining sarg'ayishi (xloroz) va o'sishning sekinlashishiga olib keladi. Ma'lumotlarga ko'ra, tuproqdagi

temirning biofoydaliligi tuproq pH darajasiga bog'liq bo'lib, pH 6,5 dan yuqori bo'lsa, temirning o'zlashtirilishi kamayadi.

#### 2. Rux (Zn):

Rux o'simliklarda fermentativ reaksiyalarni faollashtiradi va hujayra o'sishini boshqaradi. U auksin gormonlarining sintezida ishtirok etib, o'simliklarning o'sishini tartibga soladi. Rux yetishmovchiligi barglarning maydalanishi, o'simlikning quruq biomassa hajmining kamayishi va gul hosil qilishdagi nuqsonlarga olib keladi.

#### 3. Bor (B):

Bor o'simliklarda hujayra devorini shakllantirish va meva hosil bo'lishida ishtirok etadi. Bu elementning yetishmovchiligi gul changchilari va urug'larning shakllanish jarayonini buzadi. Ma'lumki, bor yetishmovchiligi bodring, pomidor va boshqa sabzavotlarda hosildorlikni 20-30% kamaytirishi mumkin.

#### 4. Marganets (Mn):

Marganets fotosintez jarayonida suvni parchalanishiga yordam beradi va qator fermentativ reaksiyalarda katalizator sifatida ishlaydi. Marganets yetishmovchiligi o'simlik barglarida sariq-yashil nuqtalar paydo bo'lishiga olib keladi. Tuproqning yuqori pH darajasida marganetsning o'zlashtirilishi pasayadi.

#### 5. Mis (Cu):

Mis lignin sintezida va o'simlikning stressga chidamliligini oshirishda muhimdir. Mis yetishmovchiligi natijasida barglar burishadi va ildiz tizimi yomon rivojlanadi. Xususan, boshqoqli ekinlarda mis yetishmovchiligi hosil miqdorini 15-20% kamaytirishi aniqlangan.

#### 6. Molibden (Mo):

Molibden azot birikmalarini o'zlashtirish va nitratni ammoniyga aylantirishda ishtirok etadi. Uning yetishmovchiligi dukkakli o'simliklarda azot fiksatsiyasini susaytiradi. Tuproqning kislotali muhitida molibdenning biofoydaliligi sezilarli darajada kamayadi.

#### 7. Xlor (Cl):

Xlor o'simlikning suv balansi va osmotik bosimni boshqarishda ishtirok etadi. Xlor yetishmovchiligi barglarning so'lishi va qurishiga olib keladi.

O'simliklarning tuproqdan mikroelementlarni qabul qilishi tuproqning fizik-kimyoviy xususiyatlariga bog'liq. Masalan, tuproqning pH darajasi, organik moddalar miqdori va minerallarning eruvchanligi mikroelementlarning o'zlashtirilishiga sezilarli ta'sir qiladi. Kislotali tuproqlarda temir va marganets yaxshi eriydi, biroq ishqorli tuproqlarda ularning o'zlashtirilishi kamayadi. Bu yerda tuproqni tahlil qilish va mos o'g'itlarni qo'llash zarurati tug'iladi.

Mikroelement yetishmovchiligining o'simliklarga ta'siri

Mikroelement yetishmovchiligi tufayli o'simliklarning o'sishi sekinlashadi, barglar sarg'ayadi, ildiz tizimi rivojlanmaydi, va hosildorlik keskin pasayadi. Misol uchun:

- Rux yetishmovchiligi – mevali daraxtlarda o'simliklar kichik bargli va past o'suvchan bo'ladi.
- Bor yetishmovchiligi – gul changchilari buziladi, bu esa meva hosil bo'lmasligiga olib keladi.
- Temir yetishmovchiligi – barglar sarg'ayib, xloroz kuzatiladi.

Bu muammolarni hal qilish uchun mikroelementli o'g'itlar, foliar oziqlantirish va tuproqni yaxshilash texnologiyalari qo'llaniladi.

Tuproq o'simliklarning asosiy oziqlanish manbai hisoblanadi va undagi mikroelementlarning mavjudligi o'simliklarning sog'lom rivojlanishi uchun hal qiluvchi omil sanaladi. Mikroelementlarning tuproqdagi konsentratsiyasi va ularning o'zlashtirilishi tuproqning fizik-kimyoviy xususiyatlari, jumladan pH darajasi, tuz tarkibi, organik modda miqdori va namlik darajasiga bog'liq.

Tuproqning pH darajasi va mikroelementlar

Tuproq pH darajasi mikroelementlarning biofovdaliligiga katta ta'sir ko'rsatadi.

- Kislotali tuproqlar ( $\text{pH} < 6$ ): Temir, marganets va rux kabi elementlar kislotali sharoitda erkin holda bo'ladi va o'simlik tomonidan oson singdiriladi. Ammo, bunday tuproqlarda molibden va borning biofovdaliligi pasayadi.

- Ishqorli tuproqlar ( $\text{pH} > 7$ ): Temir va marganetsning eruvchanligi kamayadi, bu esa o'simliklarda xloroz va fotosintez buzilishlariga olib keladi.

Tuproqdagi organik modda miqdori mikroelementlarning o'zlashtirilishiga ijobiy ta'sir qiladi. Organik moddalarning parchalanishi natijasida hosil bo'ladigan kislotalar mikroelementlarni bog'lab, ularning o'simlik tomonidan qabul qilinishini osonlashtiradi. Masalan, organik tuproqlarda temir va marganets yaxshi eriydi, bu esa yuqori hosildorlikka olib keladi.

Mikroelementlarning harakatchanligi

Tuproqdagi mikroelementlarning o'simlik ildizlariga yetib borishi ularning harakatchanligi bilan belgilanadi. Marganets va temir kam harakatchan elementlar bo'lib, ular tuproqning faqat yaqin qatlamlaridan o'zlashtiriladi. Rux va bor nisbatan ko'proq harakatchan bo'lib, ularning o'simlikka o'zlashtirilishi tuproq namligi va haroratiga bog'liq.

Tuproqning sho'rlanishi va mikroelementlar

Sho'rlangan tuproqlarda mikroelementlarning o'simlik tomonidan o'zlashtirilishi qiyinlashadi. Natijada, tuproqdagi yuqori konsentratsiyadagi natriy va xlor o'simliklarga zarar keltirishi, shu bilan birga, temir va rux kabi elementlarning biofovdaliligini pasaytirishi mumkin. Bunday sharoitlarda tuproqni gidrotexnik melioratsiya usullari bilan tiklash zarurati tug'iladi.

Tuproqni yaxshilash va mikroelementlarni boshqarish

O'simliklar uchun zarur bo'lgan mikroelementlarning yetishmovchiligini oldini olish uchun tuproq sifatini yaxshilash muhimdir:

- Tuproq tahlili: Tuproqdagi mikroelementlar tarkibini o'lchash orqali muayyan o'g'itlar qo'llanadi.

- Mikroelementli o'g'itlar: Chelat shaklidagi o'g'itlar mikroelementlarning biofovdaliligini oshiradi.

- Organik moddalar qo'shish: Kompost va chirindi mikroelementlarning o'zlashtirilishini yaxshilashga yordam beradi.

Tuproq va mikroelementlar o'rtasidagi o'zaro bog'liqlikni to'g'ri boshqarish o'simliklarning hosildorligi va stressga chidamliligini ta'minlashda hal qiluvchi ahamiyatga ega. Zamonaviy qishloq xo'jaligida bu masala tuproq unumdorligini oshirish va ekologik xavfsizlikni saqlash maqsadida keng qo'llanilmoqda.

Mikroelementlar yetishmovchiligi

Mikroelementlarning yetishmovchiligi o'simliklarning normal rivojlanishi va fiziologik jarayonlariga sezilarli salbiy ta'sir ko'rsatadi. Ushbu muammo tuproqdagi mikroelementlarning

miqdoriy kamligi, ularning o'zlashtirilishidagi muammolar yoki tuproq sharoitlarining mos kelmasligi tufayli yuzaga keladi. Mikroelement yetishmovchiligi o'simliklarning o'sishi va hosildorligini sezilarli darajada pasaytirishi mumkin.

Mikroelementlar yetishmovchiligiga xos belgilar

1. Temir yetishmovchiligi (Fe):

- Barglar sarg'ayadi, ayniqsa, yosh barglarda xloroz paydo bo'ladi.
- Fotosintez jarayoni pasayadi, bu o'simlikning o'sishining sekinlashishiga olib keladi.
- Tuproq pH darajasi yuqori bo'lgan (ishqorli) tuproqlarda kuzatiladi.

2. Rux yetishmovchiligi (Zn):

- Barglarda mayda oq yoki sariq dog'lar hosil bo'ladi.
- O'simlikning quruq biomassasi kamayadi, novdalar qisqa bo'lib o'sadi.
- Gormonlar (auksin) sintezining buzilishi tufayli o'sishning sekinlashishi kuzatiladi.

3. Bor yetishmovchiligi (B):

- Gul va mevalar hosil bo'lmaydi yoki to'kiladi.
- Hujayra devori shakllanishining buzilishi tufayli ildizlar va novdalarda deformatsiyalar kuzatiladi.
- Meva va sabzavotlarda hosildorlik 30% gacha kamayishi mumkin.

4. Marganets yetishmovchiligi (Mn):

- Barglarda sariq-yashil chiziqlar paydo bo'ladi.
- Fotosintez va nafas olish jarayonlari susayadi.
- Bu muammo kislotali tuproqlarda kam uchraydi, lekin ishqorli tuproqlarda keng tarqalgan.

5. Mis yetishmovchiligi (Cu):

- Barglar burishadi va o'simlikning o'sish darajasi pasayadi.
- Stress sharoitlarga chidamlilik kamayadi.
- Tuproqdagi organik moddalarning yetarli bo'lmaganida yuzaga keladi.

6. Molibden yetishmovchiligi (Mo):

- Barglar sarg'ayadi va quriydi, azot fiksatsiyasi pasayadi.
- Bu muammo ko'pincha kislotali tuproqlarda uchraydi.

7. Xlor yetishmovchiligi (Cl):

- Barglarning uchlari va chetlari so'lishi kuzatiladi.
- O'simliklarning suv muvozanati buziladi.

Mikroelement yetishmovchiligining oqibatlarini

Mikroelementlarning yetishmovchiligi natijasida quyidagi holatlar kuzatiladi:

- O'simlikning o'sish va rivojlanishi sekinlashadi.
- Fotosintez samaradorligi pasayadi.
- Meva va urug'larning shakllanishida nuqsonlar yuzaga keladi.
- Stress sharoitlariga (qurg'oqchilik, sho'rlanish) chidamlilik kamayadi.

Yetishmovchilikni bartaraf etish usullari

1. Tuproq tahlili: Mikroelementlarning tuproqdagi miqdorini aniqlash va mos choralarni qo'llash zarur.

2. Mikroelementli o'g'itlar: Temir chelati, rux sulfat, bor kislotasi kabi maxsus o'g'itlar tuproq yoki barglarga qo'llanilishi mumkin.

3. Organik moddalar qo‘shish: Kompost va chirindi tuproq unumdorligini oshiradi va mikroelementlarning o‘zlashtirilishini yaxshilaydi.

4. Foliar oziqlantirish: Mikroelementli o‘g‘itlarni püskürtish orqali o‘simliklarning barglari orqali oziqlanishini ta‘minlash samarali usullardan biridir.

Mikroelement yetishmovchiligini oldini olish o‘simliklarning salomatligini ta‘minlash, hosildorlikni oshirish va qishloq xo‘jaligida ekologik barqarorlikni saqlash uchun muhim ahamiyatga ega.

Xulosa

Mikroelementlar o‘simliklarning fiziologik jarayonlarida muhim rol o‘ynab, ularning o‘sishi, rivojlanishi va hosildorligini belgilovchi asosiy omillardan biri hisoblanadi. Temir, rux, bor, marganets, mis, molibden va xlor kabi mikroelementlarning tuproqdagi miqdori va o‘zlashtirilish darajasi o‘simliklarning umumiy holatiga sezilarli ta‘sir ko‘rsatadi. Ushbu elementlarning yetishmovchiligi natijasida o‘simliklarning fotosintez, hujayra bo‘linishi, gormonlar sintezi va oziqlanish jarayonlari buziladi, bu esa hosildorlikni kamaytiradi.

Maqolada tuproqning fizik-kimyoviy xususiyatlari, mikroelementlarning harakatchanligi va biofoidaliligi, shuningdek, mikroelement yetishmovchiligining oldini olish usullari batafsil tahlil qilindi. Olingan ma‘lumotlar mikroelementlar yetishmovchiligi muammosini hal qilishda tuproqni tahlil qilish, maxsus o‘g‘itlarni qo‘llash va organik moddalarni tuproqqa kiritishning samaradorligini ko‘rsatadi.

Zamonaviy qishloq xo‘jaligi tizimida mikroelementlarni boshqarish usullarini joriy etish o‘simliklarning salomatligini saqlash va yuqori hosildorlikka erishishda hal qiluvchi ahamiyatga ega. Mikroelementlarning samarali boshqaruvi tuproq unumdorligini tiklash va ekologik barqarorlikni ta‘minlashga qaratilgan kompleks yondashuvni talab etadi.

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FORMATIVE AND SUMMATIVE ASSESSMENT IN EDUCATION

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**ABSTRACT**

Assessment plays a pivotal role in the teaching-learning process, providing valuable insights into students' progress and instructional efficacy. This article examines formative and summative assessment, highlighting their definitions, purposes, methods, and impacts on educational outcomes. It also explores how these assessment types complement each other to foster a comprehensive understanding of student achievement and growth.

**KEYWORDS** *Formative assessment, summative assessment, educational outcomes, student learning, instructional strategies, feedback, growth mindset, evaluation methods, teaching practices.*

**Introduction:** Assessment in education is a multifaceted process aimed at evaluating, supporting, and enhancing student learning. Among the diverse types of assessments, formative and summative assessments are the most commonly implemented in classrooms. These two types serve distinct purposes but are interconnected, creating a balanced approach to evaluating and improving student learning. Understanding their roles, methods, and implications is essential for educators striving to optimize teaching practices and student outcomes.

Formative assessment- definition and purpose formative assessment is an ongoing process that teachers use during instruction to gather feedback about students' learning. Its primary goal is to inform teaching and help students identify their strengths and areas for improvement. Unlike summative assessments, formative assessments are not graded; instead, they emphasize learning over evaluation. Methods of formative assessment Common methods of formative assessment include:

1. Observations: Teachers monitor students' engagement and participation in real-time.
2. Questioning: Thought-provoking questions to gauge understanding and stimulate critical thinking.
3. Peer Assessment: Students evaluate each other's work, promoting collaborative learning.
4. Self-Assessment: Students reflect on their performance and identify areas for improvement.
5. Quizzes and Exit Tickets: Short assessments to check comprehension at the end of a lesson.

Impact on Learning Formative assessment fosters a growth mindset by emphasizing progress rather than final outcomes. It encourages active learning, boosts student confidence, and enhances the teacher's ability to tailor instruction to individual needs.

Summative assessment- definition and purpose summative assessment evaluates student learning at the end of an instructional period, such as a unit, semester, or course. It measures the

extent to which learning objectives have been achieved and is often used for reporting purposes.

Methods of Summative Assessment Examples of summative assessments include:

1. Standardized Tests: Provide comparative data across different student groups.
2. Final Exams: Comprehensive evaluations of knowledge and skills acquired.
3. Projects and Portfolios: Showcase students' abilities and understanding over time.
4. Presentations: Assess students' communication and application of knowledge.

Impact on Learning Summative assessments provide a snapshot of achievement, helping stakeholders make decisions about curriculum effectiveness, resource allocation, and student readiness for future challenges.

Integrating formative and summative assessment

Although formative and summative assessments serve different purposes, they are interrelated. Formative assessments provide the foundation for summative assessments by ensuring students are adequately prepared. Effective integration involves:

1. Using Formative Feedback: To guide instructional adjustments that prepare students for summative evaluations.
2. Aligning Objectives: Ensuring consistency between formative activities and summative goals.
3. Data-Driven Decisions: Combining insights from both assessment types to enhance educational strategies.

Challenges in formative assessment:

- Time constraints for frequent feedback.
- Teachers' readiness to implement innovative methods.
- Students' acceptance of non-graded evaluations.

Challenges in summative assessment:

- Risk of focusing solely on grades.
- Limited feedback opportunities post-assessment.
- Potential stress for students.

Considerations for effective use: to maximize the benefits, educators should:

- Strike a balance between formative and summative assessments.
- Use diverse methods to cater to various learning styles.
- Maintain transparency in assessment criteria.

*Relevance of the research: The significance of this research lies in its focus on the dual framework of formative and summative assessments, which are critical to modern educational practices. In an era where student-centered learning and evidence-based instruction are paramount, understanding these assessment types enables educators to effectively measure and enhance student progress. Moreover, the integration of formative and summative assessments addresses the need for continuous feedback and accountability, ensuring that educational goals align with diverse learner needs. This study provides valuable insights for improving teaching methodologies, fostering academic success, and preparing students for lifelong learning.*

**Conclusion:** Formative and summative assessments are indispensable tools in education, each contributing uniquely to the teaching-learning process. While formative assessment nurtures continuous improvement and engagement, summative assessment provides a conclusive measure of achievement. Together, they create a holistic framework for understanding and enhancing student learning, ultimately driving educational success.

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**1-SINF O‘QUVCHILARIDA “IJODIY FIKRLASH” KO‘NIKMALARINI RIVOJLANTIRISHNING ZARURATI.****Murodova Aziza Sobirjonovna**

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Tabiat va insonning uyg‘unligi jamiyat rivojlanishida muhim ahamiyatga ega. Biologik va ijtimoiy omillar bolalarning intellektual rivojlanishida muhim ahamiyatga ega. Ular asosida o‘quvchilarda atrofda olam haqida ilk tasavvurlar shakllanadi. Bolalar olgan bilimlarini mustaqil ravishda amalda qo‘llash ko‘nikmalariga ega bo‘ladilar. Bolaning atrofda olamdan olgan ma’lumotlari asosida shaxsiy tasavvurlari shakllanadi [14].

Atrofdagi olam bilan munosabat bolalarda hissiy intellektning rivojlanishiga, voqelikning ro‘y berish sabab va oqibatlarini o‘rganishga yordam beradi. Masalan, fasllarning o‘zgarishi o‘simliklar, hayvonlarning o‘zgarishiga olib kelishini o‘rgatadi.

Bolalarning atrof-muhitga do‘stona munosabatda bo‘lishi ulardan ekologik madaniyatning shakllanishiga yordam beradi.

O‘quvchilarga “ijodiy fikrlash”ni o‘rgatish uchun esa ularning tasavvurlarini rivojlantirish lozim. Hech qanday ijodiy mahsulot tasavvursiz bo‘lmaydi [3]. Tasavvur ijod natijasini oldindan tasavvur qilish imkonini beradi. U obrazlar (timsillar) bilan ish ko‘radi. U obrazlarni o‘zgartirish bilan yangi, oldin mavjud bo‘lmagan ijodiy mahsulotni tug‘ilishini ta’minlaydi. “Oldin ma’lum bo‘lmagan narsa to‘g‘risida o‘ylash uchun kuchli tasavvurga ega bo‘lish kerak” – degan edi P.Feynman [12]. Tasavvur qilish uchun miyaga ma’lumotlarni idrok beradi. Idrok tashqi olamdan ma’lumotlarni qabul qilib miyada tahlil qilish jarayoni. Atrofdagi ro‘y beradigan real voqealar haqida sensor kanallari yordamida olinadigan ma’lumotlarning tahliliga bevosita idrok deyiladi. Verbal, visual yoki boshqa shakldagi ma’lumotlar asosida qilinadigan idrokka bilvosita idrok deyiladi. Ta’lim jarayonida o‘quvchilarning ijodiy fikrlash ko‘nikmalarini rivojlantirish muammolari xorijiy mamlakatlar olimlari tomonidan ko‘p vaqtlardan buyon o‘rganib kelingan, lekin ular o‘z ilmiy-tadqiqot ishlarida atrofimizdagi olamni o‘rganish jarayonida o‘quvchilarning tasavvur va ijodiy fikrlashini rivojlantirishda intellekt xaridan foydalanish imkoniyatlarini o‘rganmaganlar [3].

O‘quvchilarga “ijodiy fikrlash”ni o‘rgatish ularning tasavvurlarini rivojlantirishdan boshlanadi. “Tasavvur” inson ruhiyatining idrok, fikrlash va xotiralari o‘rtasidagi holatida bo‘lgan, boshqa ruhiy jarayonlardan farq qiladigan maxsus ko‘rinishidir [].

Tasavvur ko‘rgazmali-obrazli fikrlashning asosi bo‘lib, amaliy faoliyatsiz ham muammoni yechishga imkon berad. U voqelikni kutilmagan yangi obrazlar orqali aks ettirishdir. Tasavvur ijod natijasida oldindan tasavvur qilish va biror ko‘rinishda (verbal yoki vizual) tasvirlashga imkon beradi. Ya’ni, ijodiy mahsulotning vujudga kelishini ta’minlaydi. Tasavvur inson miyasining eng takomil kompyuterga o‘xshashligini isbotlaydi. Bu kompyuterda genlar orqali o‘tgan ko‘plab ma’lumotlar bo‘lib atrofda olamdan olinadigan ma’lumotlar ularni uyg‘otadi va ular ko‘z o‘ngimizdan o‘tadi. Endi ularni Faqat o‘zgalar ham bila oladigan shaklda tasvirlash lozim bo‘ladi. Tashqi ta’sir qancha kuchli bo‘lsa “kompyuter miyaning” unga reaksiyasi shuncha kuchli bo‘ladi. Eynshteynning fikricha tasavvur bilimdan muhimroq. Bilim cheklangan “tasavvur” esa butun olamni qamrab oladi, rivojlanishni vujudga keltiradi. O‘quvchida tasavvurni rivojlantirish uchun uni o‘ylatadigan, mulohaza yuritishga undaydigan muhitni vujudga keltirish lozim [17].

“Ijodiy fikrlash”ni yaxshilash uchun tasavvurdagi suratlarni chizish, ta’sirli musiqa eshitish, taassurotni bayon qilish, sayohat qilib ko’rganlarini hikoya qilish yaxshi natija beradi.

Tasavvurni rivojlantirishda fantaziyaning roli katta. Fantaziya tasavvurning eng yuqori darajada rivojlanganini ko’rsatadi. Shuningdek tasavvurni rivojlantirish uchun ko’zni yumib xayol surish va ularni bayon qilish yoki suratini chizish yaxshi natija beradi.

Shuningdek tasavvur qilish uchun sensor kanallaridan foydalanish ham yaxshi natija beradi.

Boshlang’ich sinf o’quvchilari fikrlash nuqtai nazaridan ham katta potensialga ega bo’ladilar. Birinchi va ikkinchi sinf o’quvchilarida vizual va vizual-timsolli (rolli) fikrlash ustun bo’lsa, uchinchi va tortinchi sinflarda og’zaki-mantiqiy va timsolli fikrlash ustun bo’ladi.

b) Ma’lumotlar qancha yaxshi kodlansa ular xotirada shuncha yaxshi saqlanadi. Odatda mulohaza yuritish, ma’nosini tushunish asosida qabul qilingan ma’lumotlar xotirada yaxshi saqlanadi. Shu nuqtai nazardan ma’lumotlarni vizuallashtirish muhim ahamiyatga ega.

c) Agar yangi ma’lumotlar miyada mavjud ma’lumotlar bilan mos kelsa miya ularni oldingilari bilan solishtirib shu lahzadayoq o’zlashtiradi. Agar mos kelmasa, ma’lumotlarni qabul qilishning dastlabki lahzalaridayoq vujudga kelgan neyronlar izi o’zgaradi.

d) Qabul qilingan ma’lumotlarni qayta ishlashning so’ngi etapi unutishdir. Miya ma’lumotlarni ahamiyatligiga qarab saralaydi. Ba’zilariga ahamiyat berilmaydi va biz ularni tezda unutamiz.

Miya 3 terabaytdan 1000 terabaytgacha ma’lumotlarni xotirada sig’dira oladi. 900 yillik tarix yozilgan Britaniya milliy arxivi materillari 70 terabaytni tashkil qiladi xolos.

Inson doimo takomillikka, ya’ni teran fikrlashga, xotirasini mustahkamlashga va tanasining sog’lom va go’zal bo’lishiga intilgan. Bular esa miya faoliyatini takomillashtirish bilan bog’liq.

Bosh miya ikkita: chap va o’ng yarimsharlarga bo’linadi [165]. Ular ma’lumotlarni bir tomondan ikkinchisiga uzatadigan tolalar dastasi (qadoqsimon modda) bilan birlashtirilgan. Shuningdek, har bir yarim shar uni qismlarga ajratuvchi 4 ta: peshona, chakka, tepa qism va ensalarga bo’linadi. Ular quyidagi faoliyatlar uchun mas’uldirlar: peshona- nutq, harakat, murakkab fikrlash; chakka qism- eshitish va hid bilish; tepa qism- tuyish va ta’im bilish; ensa qism- ko’rishni (rangni, yorug’likni, harakatni) talqin qiladi.

Birinchi sinf o’quvchilari yoshi (7-8 yoshlar) ijodiy faollikni shakllantirish uchun eng qulay hisoblanib, bu davrda o’quvchilar faol va tabiatga ko’ra qiziquvchan bo’ladilar [2]. Shuning uchun ham ularning ijodiy faolliklarini rivojlantirish muhim ahamiyat kasb etadi. Aynan shu yoshlarda o’quvchilarda nostandart fikrlash ko’nikmalari shakllantiriladi. Buning uchun o’qituvchi mashg’ulotda o’quvchini qiziqtirishi, uni ijodiy faoliyatga yetaklovchi muhit vujudga keltirishi lozim. Boshqacha aytganda, ularni ijod qilishga “ijodiy fikrlash”ga o’rgatishlari lozim. Buning uchun “ta’limning faol usullaridan” foydalanish taqozo qilinadi. Bunday mashg’ulotlarda:

- o’quvchilarni fikrlash faoliyatlari rag’batlantiriladi;
- kreativ xususiyatlarning namoyon bo’lishiga imkon yaratiladi;
- ular o’zlariga ishonch hosil qiladilar;
- kommunikativ ko’nikmalari shakllanadi;
- “ijodiy fikrlash” ko’nikmalariga ega bo’ladilar.

Fikrlash biror muammo haqida muayyan bir xulosaga kelish maqsadida mulohaza yuritmoq yoki o’ylamoqdan iborat bo’lgan bilishning psixologik jarayondir.

“Ijodiy fikrlash” – muammoning yechimini topish maqsadida biror yangilikni yaratish maqsadidagi fikrlash. Ijodiy fikrlashning mahsuli oddiy rasmdan haykalchadan tortib yuksak badiiy asargacha bo‘lishi mumkin.

Ta’limda ijodiy fikrlash – mavzuning ma’nosini tushinishga yo‘nalgan, o‘quvchilarning yangi g‘oyaga, xulosaga kelishlarini ta’minlaydigan fikrlashdir.

“Ijodiy fikrlash ko‘nikmalari” mashq qilish natijasida qo‘yilgan muammoni ijobiy yechish usullarini o‘lashtirish mahoratidir.

Mantiqiy fikrlash (logic thinking) – sensor kanallari atrofdagi olamdan olinadigan ma’lumotlarni sabab va oqibat zanjiri orqali ongda qayta ishlanishidir. Bu mulohazalar zanjiri o‘zgalar uchun ham tushunarli bo‘lib, oxirgi fikr qariyb bir xil bo‘ladi. Bunday ko‘nikmalarga ega kishilar bilimlarni boricha o‘zlashtira oladilar xolos.

Nostandart fikrlash (non standart thinking) mantiqiy fikrlash tarzidan farq qilib noodatiy yo‘llar bilan xulosa chiqarish jarayonidir. U muammoni yechishning g‘ayrioddiy usullarini topishdir. Nostandart fikrlash aniq bir individga taalluqli bo‘lib u uzoq mashq qilishning natijasidir. Bunday ko‘nikmaga ega kishilar yuksak intellektual imkoniyatlarga va ilmiy salohiyatga ega bo‘ladilar. Nostandart fikrlash ko‘nikmalarini ta’lim jarayonida shakllantirish va rivojlantirish mumkin. U kuchli iqtidorni yuzaga chiqarishga yordam beradi.

Fikrlash narsalarning yaxshi tomoni va ularni yanada yaxshilashga qaratilgan bo‘lmog‘i kerak. O‘quvchilarni har qanday vaziyatda ham voqeaning ijodiy tomonlarini topishga o‘rgatish lozim. Ijodiy fikrlash ko‘nikmalari – qo‘yilgan muammoni ijodiy yechish usullarining egallaganligi. Bu sohada orttirilgan mahorat, malaka.

Nostandart fikrlash – tanlangan yo‘ldan to‘g‘ri harakat qilmasdan turli yondashuv va imkoniyatlarni tekshirtirishdir. U ijodga bevosita aloqador. Nostandart fikrlash uchun tasavvur, metafora (istiora), analogiya va intuitsiya muhimdir. Metafora va analogiya ma’lum bir sohadagi g‘oyalarni butunlay boshqa sohalarga tadbiq etishga imkon beruvchi usullardir. O‘quvchilarga bu usullarni o‘rgatish kelgusida ularni nostandart fikrlovchilar bo‘lishlarini ta’minlay oladi.

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## GLIKOLIZ VA UNING HUYAYRA METABOLIZMIDAGI O'RNI

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**Annotatsiya:** Glikoliz – bu glukozaning piruvatga aylanish jarayoni bo'lib, hujayra metabolizmi uchun muhim energiya manbai hisoblanadi. O'simliklar fiziologiyasida glikolizning o'rni katta ahamiyatga ega, chunki bu jarayon fotosintezdan keyingi energiya ishlab chiqarishning dastlabki bosqichlaridan biridir. Maqolada glikoliz jarayonining o'simlik hujayrasidagi roli, uning o'sish, rivojlanish va javob reaksiyalaridagi ahamiyati, shuningdek, o'simliklarning stress holatlariga qarshi kurashishdagi roli yoritiladi. O'simliklarda glikolizning turli tizimlar bilan integratsiyasi, masalan, TCA tsikli va fermentatsiya jarayonlari bilan o'zaro aloqalari ham ko'rib chiqiladi.

**Kalit so'zlar:** Glikoliz, o'simliklar fiziologiyasi, hujayra metabolizmi, energiya ishlab chiqarish, piruvat, fotosintez, o'simlik stressi, fermentatsiya, TCA tsikli, metabolik integratsiya.

Glikoliz, glukozaning molekulasining ikkita piruvat molekulariga parchalanish jarayonidir. Bu jarayon hujayraning energiya ishlab chiqarish tizimida muhim o'rin tutadi va barcha organizmlarda, shu jumladan o'simliklarda, energiya ishlab chiqarish uchun zaruriy bosqichdir. O'simliklar fiziologiyasida glikolizning roli nafaqat energiya manbai sifatida, balki o'simliklarning rivojlanishi va stress holatlariga qarshi javob berishidagi ahamiyatini ham o'z ichiga oladi.

O'simliklar fotosintez jarayonida nur energiyasini kimyoviy energiyaga aylantiradi, ammo bu jarayon oxirgi mahsulotlarning barcha energiya ehtiyojlarini qoplay olmaydi. Shuning uchun glikoliz o'simlik hujayralarida yana bir asosiy energiya manbai bo'lib, xususan, qarbsiz sharoitda yoki kislorod miqdori past bo'lgan joylarda ahamiyatli bo'ladi. Glikoliz jarayoni o'simlik hujayrasidagi eng tezkor energiya ishlab chiqaruvchi tizimlardan biri hisoblanadi va bu jarayonning samarali ishlashi o'simlikning hayotiy faoliyatini ta'minlaydi.

Glikolizdan so'ng hosil bo'lgan piruvat molekulari TCA (trikarboksilat kislotasi) tsikliga kirib, keyingi bosqichlarda energiya ishlab chiqaradi. TCA tsikli hujayra mitoxondriyasida amalga oshadi va glikolizning natijalarini yanada chuqurlashtirib, energiya ishlab chiqarishning yanada samarali tizimini yaratadi. O'simliklarda, ayniqsa, kuchli fotosintez jarayoni va glikolizning birgalikda ishlashi, energiya ishlab chiqarishda sinergiya hosil qiladi.

O'simliklar turli stress sharoitlariga, jumladan, qurg'oqchilik, ortiqcha issiqlik, zararkunandalar yoki kasalliklar ta'siriga duch kelishadi. Glikoliz jarayoni bu stress holatlariga javob berish uchun zarur bo'lgan energiyani ta'minlashda muhim rol o'ynaydi. Glikolizning aktivlashuvi o'simlikning stressga qarshi himoya mexanizmlarini faollashtiradi, masalan, o'sishning ta'minlanishi va zararlangan hujayralarning tiklanishi.

Glikolizning yakuniy mahsuloti piruvat bo'lib, kislorod yetarli bo'lmagan holatlarda fermentatsiya jarayoni boshlanadi. O'simliklarda anaerob sharoitlarda glikoliz jarayoni davomida piruvatning etanolga yoki laktatga aylanishi mumkin. Bu jarayonlar o'simliklarning kislorodsiz sharoitda o'sishini va rivojlanishini ta'minlaydi, shu bilan birga, stress sharoitlari ostida hayotiy faoliyatini saqlab qolishga yordam beradi.

O'simlik hujayrasidagi metabolik jarayonlar bir-biri bilan chuqur integratsiyalashgan. Glikoliz faqatgina bir qism bo'lib, uning natijalari boshqa metabolik yo'llar, masalan, lipidlar va aminokislotalar sintezi bilan o'zaro bog'liq. Shuningdek, glikolizning faoliyati o'simliklarning o'sish va rivojlanish bosqichlariga, ayniqsa, urug'ning rivojlanishi, ildiz va barglarning o'sishi kabi jarayonlarga ta'sir qiladi.

Glikoliz o'simliklarning normal metabolizmi va hayotiy faoliyati uchun zaruriy jarayon bo'lib, bu jarayon o'simlikning energiya ta'minotini, rivojlanish bosqichlarini va stress holatlariga javobini ta'minlaydi. Glikolizning o'simlik hujayrasidagi o'rni nafaqat energiya ishlab chiqarishda, balki o'simliklarning adaptiv mexanizmlarini boshqarishda ham muhim rol o'ynaydi. O'simliklarning metabolik tizimlarini to'liq tushunish, ularning yaxshilanishi va stressga chidamliligini oshirish uchun yangi yondashuvlar yaratish imkonini beradi.

Glikoliz, glukoza molekulasining ikki piruvat molekulasiga parchalanish jarayoni bo'lib, o'simlik hujayrasidagi energiya ishlab chiqarishning muhim bosqichlaridan biridir. Bu jarayon hujayra ichida energiya hosil qilishning tez va samarali yo'li sifatida faoliyat ko'rsatadi. O'simliklar fotosintez jarayonida quyosh energiyasini kimyoviy energiyaga aylantiradi, ammo bu energiya butunlay energiya ehtiyojlarini qoplamaydi. Shuning uchun, glikoliz o'simlik hujayralarida bu ehtiyojlarni qoplash uchun zarur bo'lgan muhim yo'ldir.

#### 1. Glikolizning Asosiy Bosqichlari va O'simliklardagi O'rni

Glikoliz, glukoza molekulasidan ikki molekula piruvat va ikkita molekula ATP (adenozin trifosfat) ishlab chiqarishni ta'minlaydi. Glikolizning boshlanishi glukoza yoki boshqa monosaxaridlar, masalan, fruktoza va galaktoza, hujayralarga kiritilishi bilan amalga oshadi. Glukoza glikoliz yo'li bilan piruvatga aylanadi, bu jarayon oksidlanish va fosforlanish reaksiyalarini o'z ichiga oladi. Ushbu jarayon ATP va NADH (nikotinadenin dinukleotid) ishlab chiqarishda ishtirok etadi, bu esa keyinchalik hujayra energiya ta'minoti uchun ishlatiladi.

O'simliklarda glikoliz jarayoni nafaqat hujayra energiyasini ta'minlash, balki hujayraning barcha metabolik jarayonlariga ham asos bo'ladi. O'simliklar fotosintez va respiratsiya orqali energiya olishadi, lekin glikoliz boshqa yo'llarda energiya ishlab chiqarish uchun ham ishlatiladi, masalan, anaerob sharoitda (kislorod etishmovchiligi holatida) fermentatsiya jarayonida.

#### 2. Glikoliz va TCA Tsikli O'rtasidagi Aloqa

Glikolizdan so'ng hosil bo'lgan piruvat molekullari mitoxondriyada joylashgan TCA (trikarboksilat kislota) tsiklida qatnashish uchun kiradi. TCA tsikli kislorod mavjud bo'lgan sharoitda amalga oshadi va piruvatning to'liq oksidlanishiga olib keladi, natijada yanada ko'proq ATP va NADH hosil bo'ladi. O'simliklarda glikoliz va TCA tsiklini birgalikda o'rganish muhim, chunki ularning o'zaro aloqasi o'simlikning umumiy metabolik faoliyatini boshqaradi. Glikoliz jarayonining natijasida hosil bo'lgan piruvat bir necha yo'llar bo'yicha metabolizatsiyaga uchraydi, shu jumladan TCA tsikliga kirib, hujayra uchun energiya manbai bo'ladi.

#### 3. Glikoliz va Stressga Qarshi Reaksiyalar

O'simliklar o'z hayotini davom ettirish uchun turli xil stress sharoitlariga qarshi kurashadi. Bunday stress holatlariga qurg'oqchilik, issiqlik, zararli gazlar yoki zararkunandalar ta'sir qiladi. Bu sharoitlarda glikoliz jarayoni o'simlikning moslashuvchanligini ta'minlashda muhim rol o'ynaydi. O'simliklar stress holatida energiya ishlab chiqarish uchun glikolizni faollashtiradi, bu esa tezda zarur bo'lgan resurslarni ta'minlashga yordam beradi. Masalan,

anaerob sharoitda glikolizning intensivlashishi o'simlikka kislorod etishmovchiligini engib o'tishda yordam beradi.

Anaerobik sharoitda glikoliz natijasida hosil bo'lgan piruvat etanolga yoki laktatga aylanishi mumkin, bu fermentatsiya jarayonlarini boshlaydi. Bu jarayonlar o'simlikning stressga chidamli bo'lishini ta'minlaydi. Agar o'simliklar kislorodsiz muhitda uzoq vaqt qolsa, fermentatsiya jarayonlari ularning metabolik faoliyatini saqlab qolishga yordam beradi. Shu tarzda glikoliz va fermentatsiya jarayonlari o'simliklar uchun muhim himoya mexanizmi hisoblanadi.

#### 4. Glikoliz va Metabolik Integratsiya

Glikoliz faqat bir qismi bo'lib, uning faoliyati boshqa metabolik yo'llar bilan integratsiyalashgan. O'simlik hujayralaridagi barcha metabolik yo'llar o'zaro bog'liq bo'lib, glikolizning natijalari boshqa jarayonlar, masalan, lipidlar va aminokislotalar sintezi bilan o'zaro aloqada bo'ladi. Glikolizning bir nechta intermediari boshqa metabolik yo'llarga kirib, o'simlikning o'sish, rivojlanish va javob reaksiyalarini tartibga soladi. Shu bilan birga, glikolizning yuqori darajada boshqarilishi o'simlikning adaptiv mexanizmlarini qo'llab-quvvatlaydi va stress holatlariga moslashishga yordam beradi.

#### 5. Glikoliz va O'simliklarning O'sishiga Ta'siri

O'simliklarning o'sish va rivojlanishi uchun zarur bo'lgan energiya manbalari glikoliz orqali ishlab chiqariladi. Bu jarayonlar, ayniqsa, urug'ning rivojlanishi, ildiz va barglarning o'sishiga ta'sir qiladi. Glikolizning faoliyatini oshirish, o'simliklarning o'sishini tezlashtirishi mumkin, chunki ularning metabolik jarayonlarini qo'llab-quvvatlashda ishtirok etadi. Glikolizning intensivligi o'simlikning o'sish bosqichiga bog'liq bo'lib, u fotosintez jarayonlari bilan integratsiya orqali o'sish va rivojlanishning optimal sharoitlarini yaratadi.

Glikoliz jarayoni o'simliklar fiziologiyasida muhim o'rin tutadi. Bu jarayon energiya ishlab chiqarishda, o'sish va rivojlanish bosqichlarida, shuningdek, stressga qarshi kurashishda ahamiyatlidir. Glikolizning o'simlik hujayrasidagi o'rni nafaqat energiya ishlab chiqarish, balki o'simlikning adaptiv mexanizmlarini boshqarishda ham muhimdir. O'simliklar metabolizmining kompleks tizimini tushunish, ularning stressga chidamliligini oshirish va yaxshilanishi uchun yangi yondashuvlarni ishlab chiqish imkonini beradi. Glikoliz va boshqa metabolik yo'llarning integratsiyasi o'simliklarning ekologik moslashuvchanligini va samarali o'sishini ta'minlaydi.

#### Xulosa:

Glikoliz jarayoni o'simliklar fiziologiyasida muhim va ajralmas o'rin tutadi. Bu jarayon o'simlik hujayrasidagi energiya ishlab chiqarishning asosiy bosqichlaridan biri sifatida, o'simliklarning normal hayotiy faoliyatini ta'minlashda katta rol o'ynaydi. Glikoliz o'simliklarning o'sish, rivojlanish va stress sharoitlariga qarshi javob reaksiyalarini boshqarishda ishtirok etadi. Fotosintez va glikoliz jarayonlarining o'zaro integratsiyasi o'simliklarga energiya ishlab chiqarishda yuqori samaradorlikni ta'minlaydi.

Stress holatlarida glikolizning faollashuvi o'simliklarning anaerobik sharoitlarda ham faoliyat yuritishini davom ettirishga yordam beradi. Fermentatsiya jarayonlari, glikolizning natijalaridan foydalanib, o'simlikning hayotiy faoliyatini saqlab qolish imkonini beradi. Shu bilan birga, glikolizning o'simliklarning o'sish jarayonlari va metabolik muvozanatini boshqarishdagi o'rni ko'rsatilgan. O'simliklar metabolizmi o'zaro bog'liq bo'lgan bir nechta jarayonlar to'plamidir, va glikolizning samarali ishlashi o'simlikning ekologik moslashuvchanligini oshirishda muhim omil hisoblanadi.

Kelajakda glikoliz jarayonini yaxshilash va o'simliklarning stressga chidamliligini oshirish uchun yangi biotexnologik yondashuvlarni ishlab chiqish mumkin. Shu tariqa, glikolizning o'simliklar metabolizmidagi o'rni nafaqat ilmiy, balki agronomik va ekologik sohalarda ham muhim ahamiyatga ega.

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**STUDY OF THE WORKING BODIES OF THE MACHINE THAT PREPARES THE SOIL FOR PLANTING POTATOES**

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**Abstract.** The purpose of the study is to substantiate the parameters of the guide knife and the loosening pointed leg of the machine. The basic principles and methods of classical mechanics, mathematical analysis and statistics were used in this study. Theoretical studies were carried out to determine the parameters of the guide knife and the loosening pointed leg of the machine. It is established that to ensure the required value of the crest height with minimal energy consumption, the height and length of the guide knife should be 8 and 15 cm, respectively, the angle of the knife blade to the horizon -  $30^\circ$ , the longitudinal distance from the toe of the ploughshare body of the knife toe – 13 cm. To ensure the required crumbling of the soil, the width of the pointed loosening paw should be 15 cm.

**1 Introduction**

In the world, the leading place is occupied by the development and application of energy-saving and high-performance machines for tillage and preparing it for sowing. At the same time, much attention is paid to the development of machines that perform all the technological processes of tillage and preparing it for sowing potatoes on ridges in one pass through the field.

F.M.Mamatov [1-2], V.I.Kurdyumov [3], B.C.Lakhmakov [4] and others were engaged in research on the creation and use of combined machines for processing and preparing soil for sowing agricultural crops, substantiating the parameters of working bodies, as well as studying their processes of interaction of working bodies with the soil.

However, these studies do not sufficiently study the issues of tillage for sowing potatoes with the simultaneous formation of ridges that ensure high quality work with minimal energy costs.

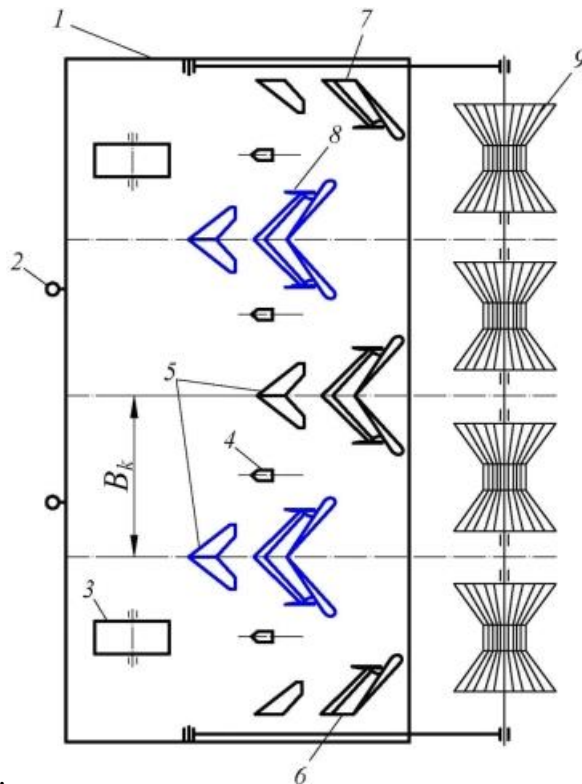
The purpose of the study is to substantiate the parameters of the guide knife and the loosening pointed leg of the machine.

**2 Methods and results**

The basic principles and methods of classical mechanics, mathematical analysis and statistics were used in this study.

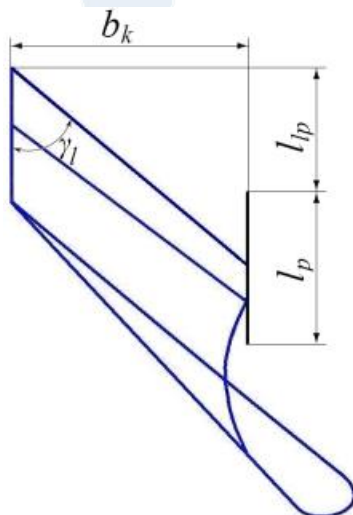
In order to substantiate the constructive scheme of the machine implementing the proposed technology and the types of working bodies, the constructions of the machines preparing the fields for planting were created in detail by the researchers. As a result, a constructive scheme of the machine was developed, which implements the technology of preparing the soil for planting potatoes for planting (Fig. 1).

It includes frame 1, tractor mounting bracket 2, base wheels 3, frame-mounted recesses 4, axle softener claws 5, right and left swivel housings 6 and 7, guide blades 8 and The profile consists of 9 reels.



**Fig. 1.** Layout of work tools on the frame: 1 – frame; 2 – wing share; 3 – base wheel; 4 – deep softener; 5 – axial softening claw; 6 and 7 – right and left turning bodies; 8 – guide knife; 9 – profile roller

The main working bodies of the machine are the body with a guide plate and a pointed flat-cutting paw. Depending on the nature of the machine, we can determine the parameters of the blade and the axle.



**Fig. 2.** Diagram for determining the parameters of the guide blade

The guide blade is attached to the edge of the 4 l ploughshare (Figure 2). Its main parameters are the distance from the beak to the blade  $l_{lp}$ ; length and height of guide blade  $l_p$  and  $h_{ep}$ ; the angle of inclination of the blade of the guide blade relative to the horizon  $\alpha_p$ ;  $i_n$  the sharpening angle of the blade is thread.

We determine the angle of inclination of the blade with respect to the horizon by the following expression from the condition of sliding the soil along it.

$$\alpha_p \leq \frac{\pi}{4} - \frac{\varphi_1}{2}, \quad (1)$$

where  $\varphi_1$  – is the angle of friction of the soil with the blade.

We put the known values of  $\mathbf{j}_I$  (25-30°) in this expression and determine that the angle  $\alpha_p$  should be in the range 30-33° and assume  $\alpha_p = 30^\circ$ .

We choose the height of the guide blade in order to minimize the interaction of the blade with the wall. Due to the fact that the housing works in a completely closed cutting position, the upper edge of the blade is crushed at the beginning of the rotation of the blade. The height of the blade, which guides the blade, can be determined by setting the rest of the blade from crushing and eliminating its interaction with the wall.

$$h_p \geq a - b_k \operatorname{tg} \tau - \Delta_p, \quad (2)$$

We determine that the minimum height of the blade, which is directed to the expression (2) by  $b_k = 0.2$  m,  $\Delta_p = 0.05$  m and  $\tau = 6^\circ$ , is not less than 79 mm. We assume  $h_p = 80$  mm.

At the beginning of the rotation of the pelvis, the pelvis is in a state of tension due to the compression of its inner upper edges. In this case, it is difficult for the blade to penetrate the blade, which can lead to the accumulation of soil in front of the housing and disruption of the technological process at the beginning. Therefore, it is advisable to place the blade as close as possible to the line of the ploughshare beak in the direction of movement. In this case, the crushing of the slab with the wall is replaced by the crushing of the soil with a steel knife. Plus, you'll be getting rid of clutter you don't need. Due to the design difficulties associated with the installation of the blade, the blade nozzle can be installed at the following distances from the body ploughshares nozzle.

$$l_{lp} = (0,5 \div 0,6) b_k \operatorname{ctg} \gamma_1. \quad (3)$$

Substituting  $b_k = 0.2$  m and  $\gamma_1 = 42^\circ$  into expression (3), we determine that the longitudinal distance from the beak of the body ploughshares to the beak of the blade is  $l_{lp} = 0.22$  m.

From Fig.2, we determine the length of the guide blade by the following formula

$$l_p = b_k \operatorname{ctg} \gamma_1 - l_{lp} + b_{le} \cos \varepsilon + \Delta l, \quad (4)$$

where  $b_{le}$  – is the width of the ploughshare heel;  $\Delta l$  – is the length of the blade, which allows the blade to touch the wall of the ridge after rising above the heel of the ploughshare.

Because the blade has a trapezoidal shape

$$\Delta l = h_p \cos \alpha_p. \quad (5)$$

Substituting the value of  $h_p$  for expression (5) into expression (2), we obtain

$$\Delta l = (a - b_k \operatorname{tg} \tau - \Delta_p) \cos \alpha_p. \quad (6)$$

In that case

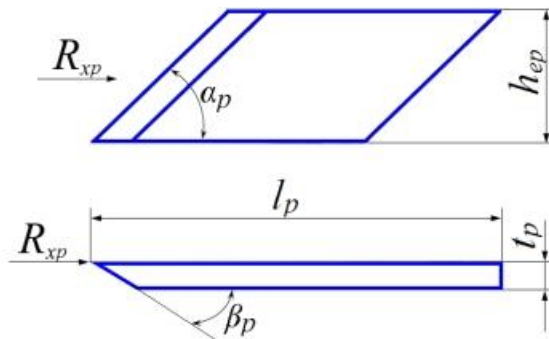
$$l_p = b_k \operatorname{ctg} \gamma_1 - l_{lp} + b_{le} \cos \varepsilon + (a - b_k \operatorname{tg} \tau - \Delta_p) \cos \alpha_p. \quad (7)$$

Add the values  $b_k = 0.2$  m,  $\gamma_1 = 42^\circ$ ,  $a = 15$  cm,  $l_{lp} = 0.22$  m,  $\Delta_p = 0.05$  m,  $\varepsilon = 25^\circ$ ,  $\tau = 6^\circ$  and  $\alpha_p = 30^\circ$  to the expression (7). Calculated calculations showed that the length of the guide blade was 0.14 m.

The gravitational resistance of the guide blade is the resistance of its blade, bevel and

sides (Fig.3).

$$R_{xp} = R_{xp}^i + R_{xp}^f + R_{xp}^s. \quad (8)$$



**Fig. 3.** Scheme for determining the forces acting on the blade

The resistance of the blade, chamfer and sides of the guide blade to the impact soil can be determined by the following formula:

$$R_{xp}^i = \sigma h_{pl} \delta (1 + f \cos \alpha_p), \quad (9)$$

$$R_{xp}^f = p \frac{t_p}{\sin \beta_p} h_p (1 + f \cos \alpha_p), \quad (10)$$

$$R_x^s = 2 f \rho_1 (l_p - h_p \operatorname{ctg} \alpha_p) h_p. \quad (11)$$

The resistance of the blade, chamfer and sides of the guide blade to the impact soil can be determined by the following formulas: where  $s$  – is the resistance of the soil to crushing in the horizontal direction;  $\delta$  – is the thickness of the guide blade, m;  $f$  – is the coefficient of friction of the soil on the steel;  $\beta_p$  – is the sharpening angle of the guide blade;  $t_p$  – is the thickness of the blade;  $\rho_1$  – is the specific pressure of the soil on the sides of the blade, Pa;  $p$  – is the specific pressure of the soil in the chamfer, Pa.

Then

$$R_x = \sigma h_{pl} \delta (1 + f \cos \alpha_p) + p \frac{t_p}{\sin \beta_p} h_p (1 + f \cos \alpha_p) + 2 f \rho_1 (l_p - h_p \operatorname{ctg} \alpha_p) h_p, \quad (12)$$

$h_p = 0,1$  m;  $l_p = 0,032$  m;  $\sigma = 2,10^6$  Pa;  $d = 0,004$  m;  $f = 0,95$ ;  $r = 1,9210^4$  Pa;  $r_1 = 1,64 \cdot 10^3$  Pa;  $b_l = 25^\circ$ ; Assuming  $b_p = 25^\circ$  and  $t_p = 0,006$  m, the calculations carried out by expression (12) show that the tensile resistance of the guide plate in the velocity range 1.5-2,0 m/s is 157,8 N showed.

The total resistance of the housing with the guide blade

$$R_k = (ab_k - \frac{1}{2} b_k^2 \operatorname{tg} \delta) (K + \varepsilon_1 V^2) + \sigma h_{pl} \delta (1 + f \cos \alpha_p) + p \frac{t_p}{\sin \beta_p} h_p (1 + f \cos \alpha_p) + 2 f \rho_1 (l_p - h_p \operatorname{ctg} \alpha_p) h_p. \quad (13)$$

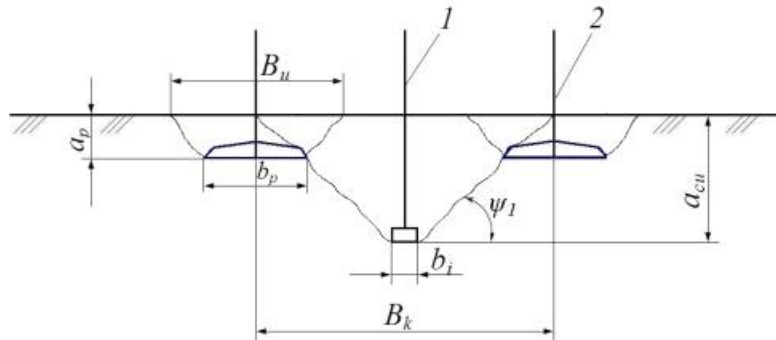
Calculations from expression (13) showed that the total resistance of the guide blade housing in the velocity range of 1.5–2.0 m / s was 2065–2138 N.

We choose an oversized softening pad as a softener to be installed in front of the housings. It cuts weeds to a depth of 8-10 cm and grinds the soil well. We determine the part of

the row spacing that the softener softens, that is, the width of its coverage, provided that the softener claws along the axis of symmetry of the formed groove. From Fig.4

$$b_p = (B_k - b_i) - 2(a_{cu} - a_p) \operatorname{ctg} \psi_1. \quad (14)$$

where  $B_k$  – is the transverse distance between the axial softening claws, m;  $a_p$  – is the working depth of the softening claw, m;



**Fig. 4.** Scheme for determining the coverage of the claw softening claw: 1 – deepening; 2 – shaped soft paw

Substituting the values  $B_k = 0,7$  m,  $b_i = 0,08$  m,  $a_p = 0,1$  m,  $a_{cu} = 0,35$  m and  $\psi_1 = 48^\circ$  into the expression (15), the minimum coverage width of the axial softening claw is 140 mm. We determine that should be, we accept  $b_p = 150$  mm.

We use the following simplified formula to determine the drag resistance of an axial claw

$$R_p = k a_p b_p, \quad (15)$$

where  $k$  – is the specific resistance of the soil to the axial claw, Pa;  $a_p$  – working depth of the axial claw, m;  $b_p$  – is the width of the axial claw, m.

### 3 Conclusions

1. It is established that to ensure the required value of the height of the ridge with minimal energy consumption, the height and length of the guide knife should be 8 and 15 cm, respectively, the angle of the knife blade to the horizon –  $30^\circ$ , the longitudinal distance from the toe of the ploughshare body of the knife toe – 13 cm.

2. It is established that to ensure the required crumbling of the soil, the width of the pointed loosening foot should be 15 cm.

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