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Braichevska O., Sliusarenko I., Krupenya I., **Horobets I.** Evolution of the policy of the Republic of Finland regarding NATO membership (1994–2023) (2024). *European Politics and Society*. DOI: 10.1080/23745118.2024.2324893

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85186912275&doi=10.1080%2f23745118.2024.2324893&partnerID=40&md5=982bdfe0be85e4b9f80ddd1b806addb0

This article explores the evolution of Finland's policy regarding NATO membership from 1994 to 2023, delving into the strategic shifts and adaptations in response to changing regional and global security dynamics. The primary aim is to elucidate how Finland's unique strategic position, domestic considerations, and pre-existing security relationships influenced its pathway to NATO membership. Utilizing a methodological approach grounded in document analysis, the study scrutinizes official government reports, and treaties to trace Finland's journey toward NATO. The findings reveal a multi-phased approach in Finland's policy evolution. Conclusively, the study underscores Finland's strategic agility in adapting its foreign policy amidst changing security environments. This policy evolution, culminating in NATO membership, reflects Finland's response to regional geopolitical shifts and emerging security threats, highlighting the importance of strategic flexibility and alignment in national security policy. The article contributes to a broader understanding of small states' security strategies and alliance politics, offering valuable insights into Finland's unique experience and the dynamics of NATO expansion in the 21st century.

Kovalchuk O., Otero O., Barkaszi Z., Murray A., Divay J. A new species of Lates (Perciformes, Latidae) from the Late Miocene of Ukraine and notes on the latest records of lates perches in the Eastern Paratethys (2024). *Journal of Vertebrate Paleontology*, art. № e2299314. DOI: 10.1080/02724634.2023.2299314

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85184216497&doi=10.1080%2f02724634.2023.2299314&partnerID=40&md5=a72e4f1a75e378483cdf40f868566986

The family Latidae is considered to have originated in marine waters of the Tethys, and the fossil record of this group indicates a widespread occurrence of latid fishes in the past. In the Mediterranean–Paratethyan basins, the genus Lates is represented by a number of fossil species, the youngest of which have been reported from Miocene deposits of Italy and Ukraine. Here we report on Lates fossils recovered from Late Miocene (Pontian) deposits of the Shkodova Gora locality of Ukraine, with a description of a new species †Lates odessanus sp. nov. The new species bears distinct morphological traits, especially on its maxilla, premaxilla, and parasphenoid, not found in other spatiotemporally close relatives. The fossil record shows that much of the latid species diversity was lost after the Late Miocene, and the newly described species, †L. odessanus, appears to be the last known extinct representative of this group in low salinity deposits of the Mediterranean–Paratethyan basins. The only extant Lates species in the Mediterranean, L. niloticus, has survived in estuarine environments of the southern shore.

Kovalenko V., Tonkha O., Fedorchuk M., Butenko A., **Toryanik V.**, Davydenko G., Bordun R., Kharchenko S., Polyvanyi A. The Influence of Elements of Technology and Soil-Climatic Factors on the Agrobiological Properties of Onobrychis Viciifolia

(2024). *Ecological Engineering and Environmental Technology*, 25 (5), pp. 179–190. DOI: 10.12912/27197050/185709

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85189142179&doi=10.12912%2f27197050%2f185709&partnerID=40&md5=bd5d20aad3bf02bb2a516b26d81ea122

The significance of this study stems from the imperative to justify and advance agrobiological foundations aimed at enhancing the cultivation practices of Onobrychis viciifolia. There exists a compelling necessity to refine agronomic methodologies and streamline their comprehensive efficacy within the technological phases of cultivation. This study is aim to provide a critical analysis of scientific problem of substantiation of biological and organic foundations of the technology of Onobrychis viciifolia growing. Innovative technological interventions were formulated by extrapolating discerned patterns of influence pertaining to climatic and meteorological factors. Patterns governing the growth, development, and productivity formation of Onobrychis viciifolia were identified, and both the theoretical and practi-cal principles of contemporary methods for cultivating perennial legumes were established. The chemical compound of aboveground biomass of Onobrychis viciifolia is varied depending on researched factors. Fertilization practically did not increase the productivity of Onobrychis viciifolia. The natural fertility of low-humus chernozem soil ensures the formation of a high, stable yield without fertilizing. This is the evidence that Onobrychis viciifolia compares favorably with other perennial legumes. Due to its biological characteristics, it is much more effective, especially in leveraging natural factors for the yield formation, i.e., it plays a significant role in the biologization of plant production, and in obtaining the most environmentally friendly, high–quality, yet cheap feed. The outcomes derived from the conducted research indicate that, under uniform soil conditions and varying fertilizer levels, the mowing height emerges as the predominant factor. The highest concentrations of nutrients within the overground biomass of Onobry-chis viciifolia were noted at a cutting altitude of 11 centimeters. Concurrently, an elevation in crude protein and ash content was observed, accompanied by a concomitant reduction in the index of crude fiber.

Hrinchenko H., **Prokopenko O.**, Shmygol N., Koval V., Filipishyna L., Palii S., Cioca L.-I. Sustainable Energy Safety Management Utilizing an Industry-Relative Assessment of Enterprise Equipment Technical Condition (2024). *Sustainability (Switzerland)*, 16 (2), art. № 771. DOI: 10.3390/su16020771

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85183370270&doi=10.3390%2fsu16020771&partnerID=40&md5=486704df33dbf3de72b63d63b23908a6

The study considers approaches to ensuring energy management for the safe operation of facilities and their equipment and ways to improve it. It has been established that to ensure effective safety management of industrial enterprises, one of the critical areas is the technical diagnostics of power equipment during operation. An assessment of the actual technical condition of power equipment of VVER-1000 power units is proposed based on establishing the aging mechanisms and determining the relative evaluation coefficients for the characteristics of individual equipment elements. The results of the calculations allowed us to conclude that the obtained results correspond to the coefficients of relative assessment Ki of the technical characteristics of the power equipment that determine its degradation. Studies indicates that when assessing the state of power equipment, it is necessary to consider the presence and impact of the following operational factors that are not

considered in the design calculations: loads, high levels of mechanical stress, fatigue damage, and metal defects, which primarily indicate the presence of degradation changes. To assess the technical condition of the equipment, considering the degree of mechanical wear, 17 technical characteristics were selected to determine the aging mechanisms by signs of degradation. A mathematical model of the dependence of the relative evaluation coefficient K on changes in the operating parameters is presented, and it is noted that the most significant influence on the value of the coefficient is the temperature of the coolant at the inlet (K = 0.56). The developed approach makes it possible to improve the safety management system of power facilities by introducing the proposed model to assess the technical conditions of power equipment by defining the parameters in the overall safety management system.

Voronenko I., Bohush A., Voronenko O., Klymenko N., Kostenko I., **Kudrina O.**, **Bozhkova V.** Digital transformation research trends in Ukraine and the world: meta & bibliometric analysis (2024). *Knowledge and Performance Management*, 8 (1), pp. 74–90. DOI: 10.21511/kpm.08(1).2024.06

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190408547&doi=10.21511%2fkpm.08%281%29.2024.06&partnerID=40&md5=13f4098a86240ddec50fd5ff60246a61

In this work, the main trends in research and publication activity in digital transformation in the world and Ukraine are analyzed using meta- and bibliometric analysis. For this purpose, bibliometric data on scientific publications on the topic of digital transformations in the Google Scholar and Scopus databases were selected, which were additionally analyzed using the VOSviewer software package. Based on filtering the results obtained, an array was formed that included 366 scientific publications for 2019–2023 in Ukrainian in the Google Scholar database and 3,703 scientific publications in English for 2020–2023 in the Scopus database. Dynamic time analysis revealed a significant surge of scientific interest in the topic of digital transformations in recent years, while structural analysis revealed the multi-industry structure of existing research. The creation of bibliographic maps of keywords and publication maps allowed us to form an idea of the main thematic areas of research in the context of digital transformations and their opinion leaders. The data obtained became the basis for formulating recommendations for further areas of research in digital transformation, in particular, on the development of a unified roadmap for the digital transformation of education at different educational qualification levels and for various specialties. This will contribute to the formation of a single systemic approach to the digital transformation of Ukraine as a guarantee for the state's sustainable development, well-being, strengthening of national security, speeding up the pace of European integration processes, as well as promoting national interests at the international level.

Prokopenko O., Prause G., Bielialov T., Jarvis M., Holovanenko M., Kara I. Sustainable logistics and passenger transport in smart cities (2024). *Acta Logistica*, 11 (1), pp. 47 - 56. DOI: 10.22306/al.v11i1.448

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190296382&doi=10.22306%2fal.v11i1.448&partnerID=40&md5=c33f07b564c3c356b674bc586f0de0bf

The rapid growth of urban populations, coupled with the imperatives of decarbonization and the relentless march of urbanization, has thrust modern cities into a crucible of multifaceted challenges. In response, the Smart City concept has emerged as a shared paradigm for addressing these urban complexities. This transformative approach touches upon various facets of urban life, encompassing areas such as the economy, education, and governance. Among these, logistics stands out as a pivotal component of the Smart City framework, necessitating innovative and sustainable solutions. This article delves into the intricate nexus between sustainable logistics systems and the evolution of the

Smart City concept. Drawing from both qualitative and quantitative research methodologies, including multivariate analysis, the study synthesizes data from primary sources collected during a series of European projects conducted from 2020 to 2023, in addition to secondary data sources. A central inquiry revolves around the symbiotic relationship between e-commerce dynamics and the sustainability of smart city logistics solutions. The findings of this investigation illuminate a compelling correlation between the profitability of logistics enterprises and the key indicators of logistics development underpinning smart cities. By unveiling these interdependencies, this research contributes to our understanding of how sustainable logistics and passenger transport systems are pivotal to the ongoing development of smart cities, offering valuable insights for urban planners, policymakers, and industry stakeholders alike.

Nabochenko O. O., Dovhopola K. S., Kostenko T. M., **Stakhova L. L.**, Rudenko L. M., Omelchenko I. M., Liakhova N. Mental Health of Children with Special Educational Needs in the Context of Long-Term Crisis Challenges: As Seen by Parents (2024). *Wiadomosci lekarskie (Warsaw, Poland : 1960)*, 77 (2), pp. 280 – 286. DOI: 10.36740/WLek202402114

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190482406&doi=10.36740%2fWLek202402114&partnerID=40&md5=ead96f4b2541a28c75de692dae235ba0

OBJECTIVE: Aim: To study the peculiarities of the mental health of children with special educational needs after 1.5 years of full-scale war in Ukraine. PATIENTS AND METHODS: Materials and Methods: The mental health of children with special educational needs (SEN) as well as the peculiarities of the impact of hostilities on their emotional and volitional sphere was assessed through the anonymous survey of their parents using the questionnaire developed by the authors (25 questions). The research, which was conducted in 2023 using a Google form, involved 466 parents having children with SEN aged 6 to 10. RESULTS: Results: It was found that among the surveyed families raising children with SEN, 30.7 % of children were in the combat zone or zone of temporary occupation for a week to a month, 19.1 % - for more than a month; 36.9 % of children experienced relocation, 23.4 % were separated from their parents, 19.7 % witnessed hostilities; 49.4 % of children experienced an unstable psycho-emotional state ("emotional swings") during 1.5 years of war in Ukraine, 40.1 % - restlessness, 38.6 % - anxiety; 23.2 % of parents noted that their children were "hooked" on computer games and social networks, 11.2 % - had problems with sleep, 10.5 % - demonstrated the emergence or increase in cognitive problems. CONCLUSION: Conclusions: The negative impact of prolonged stress during the war on the mental health of children with SEN has been revealed, which requires psychological support for such children from parents and psychologists.

Golod N., Saienko V., **Liannoi M.**, Rusyn L., Yaniv O., Ivanovska O. The Dynamics of Recovery of External Breathing Function in Patients After Laparoscopic Cholecystectomy in the Acute Period Under the Influence of the Rehabilitation Program (2024). *Wiadomosci lekarskie (Warsaw, Poland : 1960)*, 77 (2), pp. 208 – 213. DOI: 10.36740/WLek202402104

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190445923&doi=10.36740%2fWLek202402104&partnerID=40&md5=92e1feb74309e7d1a55679075f09868c

OBJECTIVE: Aim: To determine the dynamics of renewal of the function of external respiration in patients after laparoscopic cholecystectomy at the acute stage of rehabilitation under the influence of a rehabilitation program. PATIENTS AND METHODS: Materials and Methods: The study is randomized, simple with blinded assessors. The forced vital capacity (FVC, l), forced expiratory

volume in the first second (FEV1, l) and peak expiratory flow rate (PEFR, l/s) were assessed. Spirometry was performed 120 patients on the first day of admission of patients to the surgical department for surgical intervention, on the second day and on the day of discharge. Methods of mathematical statistics: arithmetic mean (M) and standard error of the mean (}m), Student's t-test were calculated, differences at p<0,05 were considered statistically significant. RESULTS: Results: It has been established that laparoscopic cholecystectomy leads to a statistically significant decrease in the parameters of respiratory function in all age categories. More pronounced positive dynamics of respiratory function in the group of respiratory therapy. It was established that without respiratory therapy on the day of discharge there was no restoration (p<0.05) in groups of elderly patients of group of FVC l, FEV1 l, PEFR l/s; in middle-aged patients did no restoration FEV1, l, PEFR, l/s; in younger patients there was no recovery of FEV1, l. CONCLUSION: Conclusions: The results of the study indicate the effectiveness of the introduction of diaphragmatic breathing exercises in combination with early mobilization at the acute and subacute stages of rehabilitation in patients after laparoscopic cholecystectomy in order to restore the function of the respiratory system.

Gruenbaum B. F., Zlotnik A., **Oleshko A.**, Matalon F., Shiyntum H. N., Frenkel A., Boyko M. The Relationship between Post-Traumatic Stress Disorder Due to Brain Injury and Glutamate Intake: A Systematic Review (2024). *Nutrients*, 16 (6), art. № 901. DOI: 10.3390/nu16060901

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85188903898&doi=10.3390%2fnu16060901&partnerID=40&md5=059d25b92da0c24d049f7a04603e888e

There is a growing body of evidence that suggests a connection between traumatic brain injury (TBI) and subsequent post-traumatic stress disorder (PTSD). While the exact mechanism is unknown, we hypothesize that chronic glutamate neurotoxicity may play a role. The consumption of dietary glutamate is a modifiable factor influencing glutamate levels in the blood and, therefore, in the brain. In this systematic review, we explored the relationship between dietary glutamate and the development of post-TBI PTSD. Of the 1748 articles identified, 44 met the inclusion criteria for analysis in this review. We observed that individuals from countries with diets traditionally high in glutamate had greater odds of developing PTSD after TBI (odds ratio = 15.2, 95% confidence interval 11.69 to 19.76, p < 0.01). These findings may support the hypothesis that chronically elevated blood glutamate concentrations caused by high dietary intake invoke neurodegeneration processes that could ultimately result in PTSD. Further studies will clarify whether lowering glutamate via diet would be an effective strategy in preventing or treating post-TBI PTSD.

Dubikovska A., Kovalchuk O. Biometric Analysis of Fish Remains from Palaeolake Boltysh (Ukraine) (2024). *Zoodiversity*, 58 (1), pp. 79–88. DOI: 10.15407/zoo2024.01.079

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85185449981&doi=10.15407%2fzoo2024.01.079&partnerID=40&md5=9bac5b4ffa7f6b58671186af6c6a4387

The results of the study of the meristic and morphometric characters of complete and fragmentary skeletons of Notogoneus gracilis (Gonorynchidae) and Boltyshia brevicauda (Umbridae) recovered from Paleocene–Eocene lacustrine deposits of the Boltysh impact structure are presented in the paper. Some of the specimens previously assigned to Thaumaturus avitus were re-identified as Boltyshia brevicauda. The meristic characters of the specimens considered are stable in both species and refer to those in the respective type series. A previously unknown caudal fin formula (I 6–6 I) is observed in several specimens of Boltyshia brevicauda. The latter species is characterised by more variable meristic characters compared to Notogoneus gracilis.

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Shkromada O., Fotina T., Ivchenko V., Chivanov V., Sirobaba V., Shvets O., Pikhtirova A., **Babenko O.**, Vorobiova I., Dychenko T. Determining the Characteristics of Concrete in A Historical Building Under the Influence of Climatic and Biological Factors (2024). *Eastern-European Journal of Enterprise Technologies*, 1 (6(127)), pp. 39–46, DOI: 10.15587/1729-4061.2024.298565

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85189836136&doi=10.15587%2f1729-4061.2024.298565&partnerID=40&md5=71779464cf15f7677ad64a5c57d67a75

The object of this study was concrete samples of the cathedral and wall frescoes. The study solved the problem related to the destruction of concrete and wall frescoes under the long-term influence of biochemical and climatic factors. Samples of concrete for research and wall murals were obtained from a historic listed building. Using microbiological studies and scanning electron microscopy, damage to wall murals and concrete by microscopic fungi was established: Aspergillus fumigatus, Penicillium brevicompactum, Aspergillus niger, Cladosporium sphaerospermum. The study of concrete samples by the TPD-MS method showed the presence of an increased level of moisture and carbon compounds by 20 % in the test samples, compared to control. The sulfur content in all concrete samples was not significant. Determination of the mineral composition of concrete by X-ray diffraction showed the presence of Al_2O_3, 36–44 %, which indicates a significant clay content. The presence of NiTi, 53 %, and $CoMg_7O_8$, 46 %, in the concrete sample indicates the probable migration of the chemical elements of the paint pigments used to decorate the cathedral. The concrete control sample contained a significant amount of SiO_2, up to 51 %, which is the main component of sand. A feature of the work is the determination of the corrosion effect on concrete under prolonged exposure to climatic and biological factors. The present study is distinguished by the use of non-destructive methods: microbiological studies, scanning electron microscopy, TPD-MS and X-ray diffraction to determine the destruction of concrete and wall frescoes of the building, which is a cultural heritage. The results of the study could be applied to the development and planning of restoration works for the restoration of buildings that have historical value

Zemko A., **Govorun O.**, Shchurenko S., Paseka M., Hnatyuk V. The Ecosystem Approach to Guaranteeing the Constitutional Human Right to a Safe Environment (2024). *Pakistan Journal of Criminology*, 16 (1), pp. 29–45. DOI: 10.62271/pjc.16.1.29.45

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85184728708&doi=10.62271%2fpjc.16.1.29.45&partnerID=40&md5=bc6476900c62b231eeb9dbc150b0a75b

The article aims to analyse the ecosystem approach, which should ensure the constitutional human right to a safe environment. The research methodology was based on the use of econometric, comparison, and graphical methods. Analysing the legal instruments, the study identified ways of harmonising the ecosystem approach with the existing legal framework and policy to improve environmental protection. The need for joint efforts between the state, industry, and local communities to find common positions and the importance of strong institutional capacity, public administration, and law enforcement mechanisms was demonstrated based on data from 37 European countries and Ukraine. It is emphasised that it is possible to achieve a balanced prospect between economic development and environmental protection. The academic novelty of this research is an interdisciplinary approach, a new application of the ecosystem approach to human rights, a detailed analysis of challenges and solutions, and global and local prospects. Prospects for further research are the expansion of the analysis database to the level of world regions to obtain generalised results regarding the provision of the constitutional human right to a safe environment.

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Loboda V. B., Zubko V. M., Khursenko S. M., Saltykova A. I., Chepizhnyi A. V. SIMS Analysis of Copper-Nickel Thin Films Alloys [ВІМС аналіз тонких плівок мідно-нікелевих сплавів] (2024). *Journal of Nano- and Electronic Physics*, 16 (1), art. № 01011. DOI: 10.21272/jnep.16(1).01011

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85188161625&doi=10.21272%2fjnep.16%281%29.01011&partnerID=40&md5=528a47eabba01b719f904319ec1dd2cd

The article presents the results of studying the elemental and isotopic composition of alloy films based on Cu and Ni films by the method of secondary ion mass spectrometric analysis (MS-7201 M secondary ion mass spectrometer). Films of alloys with a thickness of up to 130 nm were obtained on polished glass substrates with a pre-applied Al buffer layer by simultaneous separate evaporation of the components in a vacuum of 10 – 4 Pa. Copper was evaporated from a strip of tungsten foil with a thickness of 0.05 mm. Nickel was evaporated by the electron-beam method using an electron diode gun. The rate of condensation was 0.5-1.5 nm/s. The purity of evaporated metals was at least 99.98 %. Ar+ ions with an energy of 5 keV were used as probing primary ions. The results of qualitative mass spectrometric analysis of secondary ions indicate the high purity of the films (absence of hydrides, oxides and carbides of Cu and Ni). The elemental composition of the films is represented by isotopes Ni58, Ni60 and Cu63, Cu65. The ratios of isotopic intensities are I58/NI= 2,6 and i63/Cu= 2,3, which corresponds to the natural distribution of nickel and copper isotopes. I63/Cu/I58/NI The ratio of isotopic intensities practically does not change over the entire thickness of the sample. It was shown that the quantitative analysis of the elemental composition of film alloys can also be carried out by the method of secondary ion mass spectrometry.

Raiko D., Shypulina Y., Potrashkova L., **Illiashenko N.**, **Bozhkova V.**, Konokhova Z., Miroshnyk M., Nagy S., Illiashenko S., Abdunurova A. Defining a Selection Procedure of Crm Systems for The Information-Analytical Support to the Marketing Activities at an Enterprise (2024). *Eastern-European Journal of Enterprise Technologies*, 1 (13(127)), pp. 41–58. DOI: 10.15587/1729-4061.2024.298301

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190375175&doi=10.15587%2f1729-4061.2024.298301&partnerID=40&md5=aa5c08302fcbb959e11857c1e6f1fd82

The object of this study is digital marketing at an enterprise. The investigated problem is the lack of a sufficient level of systematic consideration of the task to use information communication systems and technologies in the marketing activities of enterprises. Availability of such a system would increase the company's potential in creating mutual value for the seller and the client when implementing relationship marketing technologies. It is shown that the information and analytical support of the enterprise's marketing activity can be presented as a tool of the enterprise's activity, functioning as an element of the enterprise's management system. Among the general criteria for choosing a CRM system, it is proposed to consider convenience and ease of use, flexibility of system settings for special business needs, price, simplicity. Such consideration of CRM systems and their capabilities provide economic effects that affect the profitability of the enterprise and prevent the impact of negative factors on the development of the company. The proposed procedure for choosing an adequate CRM system was verified on the example of a dental clinic, which made it possible to draw a conclusion about the feasibility of implementing a CRM system in the business under study. It is based on received estimates of short-term and long-term economic effects of the system's application. Calculated data are provided for support, which showed that the productivity of the administrator's work increased by 73.3 %, and the average duration of patient care by the doctor, taking into account the time of registration, decreased by 25 %. This is due to the fact that the system makes it possible to perform a

quick search on the general electronic database, and the time saved at this stage can be spent on performing additional work

Yepishin V., **Govorun O.** A Recent Encounter with Omiodes Monogona Meyrick, 1888 (Crambidae: Spilomelinae)-An Interesting Snout Moth Endemic to Hawaii (2024). *Zootaxa*, 5406 (2), pp. 397–400. DOI: 10.11646/zootaxa.5406.2.12

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85183970984&doi=10.11646%2fzootaxa.5406.2.12&partnerID=40&md5=1561dd36beb77ca3dddf30e778d41bdf

Rudyshyn S., Truskavetska I., Romanyuk S., **Vakal A.**, Hnatyuk V. The Role of Motivation Factors in Education for the Development of Student's Environmental Leadership in HEIs (2024). Journal of Education and Learning, 18 (1), pp. 1–8, DOI: 10.11591/edulearn.v18i1.21016

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85187448340&doi=10.11591%2fedulearn.v18i1.21016&partnerID=40&md5=333b726d3d71a81f5c80ca1974884541

This study aimed to explore the motivational factors influencing the development of environmental leadership qualities among students in higher educational institutions (HEIs). The study used surveys based on the methods of Zhang and Nunez Alonso, the Karpenko criteria, and the methods of Chen and Semedo. The study revealed that the proposed program, designed to enhance motivation and foster environmental leadership qualities, positively impacted students' motivation. Approximately one-third of students exhibited only an elementary level of environmental culture, indicating a lack of focus on environmental protection. However, applying the proposed approach increased motivation, environmental culture, and environmental leadership among students. Furthermore, a correlation was identified between motivation factors, environmental culture, and environmental leadership qualities. Future research should explore strategies for promoting ecological behavior among students, schoolchildren, and adults.

Kabylda A., Gendelis S., Kravets T., Galyanchuk I., **Vakal A.** Trajectory of air quality in Ukraine (2024). International Journal of Environmental Studies, 81 (1), pp. 239–249. DOI: 10.1080/00207233.2024.2314854

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85184417678&doi=10.1080%2f00207233.2024.2314854&partnerID=40&md5=1096651b83e5e410d1de7e88c5d28298

The article aims to analyse the ecosystem approach, which should ensure the constitutional human right to a safe environment. The research methodology was based on the use of econometric, comparison, and graphical methods. Analysing the legal instruments, the study identified ways of harmonising the ecosystem approach with the existing legal framework and policy to improve environmental protection. The need for joint efforts between the state, industry, and local communities to find common positions and the importance of strong institutional capacity, public administration, and law enforcement mechanisms was demonstrated based on data from 37 European countries and Ukraine. It is emphasised that it is possible to achieve a balanced prospect between economic development and environmental protection. The academic novelty of this research is an interdisciplinary approach, a new application of the ecosystem approach to human rights, a detailed analysis of challenges and solutions, and global and local prospects. Prospects for further research are

the expansion of the analysis database to the level of world regions to obtain generalised results regarding the provision of the constitutional human right to a safe environment.

Svierchkova O., Kalmykov S., **Rudenko A.**, Pashkevych S., Romanchuk O. Assessment of the Function of the Lower Limb and Gait of Patients After Knee Replacement Using Physical Therapy (2024). Fizicna Reabilitacia ta Rekreacijno-Ozdorovci Tehnologii, 9 (2), pp. 80–89. DOI: 10.15391/prrht.2024-9(2).06

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190410141&doi=10.15391%2fprrht.2024-9%282%29.06&partnerID=40&md5=9512d95db6845fdfea84bffae3203989

Purpose. To study the dynamics of the function of the lower limb and gait of patients after knee replacement using physical therapy. Material & Methods. Patients were randomly distributed into groups – control (CG) and study (MG), each group – 12 people (n=24). The groups received a rehabilitation intervention according to the International Classification of Functioning, Disability and Health (ICF) concept. For each person, a categorical profile was created and SMART goals were set. The developed program of physical therapy (PT) for the MG, taking into account short-term goals in a SMART format, included the use of kinesitherapy according to the author's method, hydrokinesitherapy and physiotherapy. Lower limb function and gait were assessed before and after the intervention using the Visual Analogue Pain Scale (VAS), goniometry, Tegner-Lusholm scale and Timed Up and Go (TUG) Test. Results. VAS pain scores showed significant dynamics in both groups, but without a significant difference between the groups (p>0,05). Indicators of the amplitude of flexion in the operated knee joint approached the normative values; in patients from the MG they improved by 23,51%, and in the CG – by 10,83% (p<0,05). Improvement in indicators on the Tegner-Lusholm scale after the rehabilitation cycle occurred in both groups (p<0,05), but the results of the MG were significantly higher (p<0.05). During the repeated study, 16.66% of the CG showed an "excellent result", in the absence of such a result in the CG. Timed Up and Go (TUG) Test indicators had positive dynamics in both groups (p<0,05), but large changes were observed in the MG (p<0,05). Conclusions. analysis of the dynamics of indicators of physical functions, range of motion and gait of persons 50-64 years old after total knee replacement confirmed the advantages of the developed physical therapy program for persons in the MG.