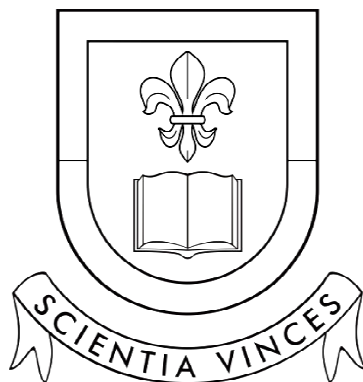


**DAUGAVPILS UNIVERSITĀTE
DAUGAVPILS UNIVERSITY**



***DAUGAVPILS UNIVERSITĀTES
64. STARPTAUTISKĀS
ZINĀTNISKĀS KONFERENCES
TĒZES***

***ABSTRACTS OF
THE 64th INTERNATIONAL
SCIENTIFIC CONFERENCE OF
DAUGAVPILS UNIVERSITY***

DAUGAVPILS UNIVERSITĀTES
AKADĒMISKAIS APGĀDS „SAULE”
2022

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Daugavpils Universitātē docētāju un studējošo zinātniskās konferences notiek kopš 1958. gada. Konferencēm ir starpdisciplinārs raksturs, tajās piedalās gan studējošie, gan arī ievērojami zinātnieki no dažādām pasaules valstīm. Daugavpils Universitātes 64. starptautiskās zinātniskās konferences pētījumu tematika ir ļoti plaša – eksaktajās, humanitārajās, izglītības, mākslas un sociālo zinātņu jomās.

Krājumā *Daugavpils Universitātes 64. starptautiskās zinātniskās konferences tēzes = Abstracts of the 64th International Scientific Conference of Daugavpils University* apkopoti materiāli, kas tiks prezentēti konferences darba grupās 2022. gada 21.-22. aprīlī un kas atbilst konferences formālajām prasībām.

Krājuma veidotāji saglabā autoru iesniegto tēžu lingvistisko un gramatisko struktūru.

Par norādītajiem faktiem, izteiktajiem viedokļiem un lietoto terminoloģiju atbild tēžu autori.

The annual scientific conferences at Daugavpils University have been organized since 1958. The themes of research presented at the conferences cover all spheres of life. Due to the facts that the conference was of interdisciplinary character and that its participants were students and outstanding scientists from different countries, the subjects of scientific investigations were very varied – in the domains of exact sciences, the humanities, education, art and social sciences.

The Collection of Abstracts of the 64th Scientific Conference of Daugavpils University contains the abstracts on researches, which will be presented in the corresponding work groups organized within the framework of the conference in April, 21-22, 2022. In the abstracts published in *Daugavpils Universitātes 64. starptautiskās zinātniskās konferences tēzes = Abstracts of the 64th International Scientific Conference of Daugavpils University* we have preserved the authors' style (linguistic and grammatical structures), and the authors themselves are responsible for the facts and opinions reflected and the terminology used in their abstracts.

MĀKSLA

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ART

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CATALOG DESIGN TRENDS IN UNIVERSITY ADVERTISMENT

Key words: *catalog, advertising, visual identity, university*

The visibility of each institution is ensured by the visual identity, which is embedded in the advertising media in both the digital environment and the print media. Nowadays, universities pay a lot of attention to visual advertising that is able to reflect the identity of the university. One of the most popular forms of visual communication is the catalog. The development of the catalog design is a very important process, as the university catalog creates the first public impression of the university, which is important in the conditions of university competition. The digital environment is also important today, especially now that, due to the epidemiological situation in the country and the world, students are forced to study at a distance and attending universities in person is often not possible. In order to popularize higher education institutions also in the digital environment, an innovation and an alternative to the physical catalog is available – an interactive or digital catalog. Paper catalogs are also still relevant, which can become a good handout for potential students. Types of paper catalogs – printable catalogs, informative catalogs, image catalogs and digital catalogs, are used based on the solution of the specific problem.

The aim of the article is to identify the design trends of university catalogs that promote their recognition and advertising.

Research methods used – literature research, analogue analysis and survey.

As a result of the research of the topic, it can be concluded that the most important design trends of university catalogs are determined by the choice of a modern type of information graphics that meets the interest of young people and the conditions for good advertising. In order to draw attention to the catalog of a particular higher education institution, it is important to integrate the elements characterizing visual identity as signs of recognition of the higher education institution or study program.

The results of the research will be used in the development of the catalog concept of the Rezekne Academy of Technology bachelor study program “Interior Design”.

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COVID-19 PANDEMIC AND FUTURE OF THE CULTURAL SECTOR

In the face of the COVID-19 pandemic there has been revived discussion of the role of the cultural sector and its functions in various spheres. In these difficult times, cultural institutions and creative professionals are looking for new and creative strategies and practices for the production and dissemination of cultural products. COVID-19 pandemic has put a considerable strain on cultural institutions and creative professionals thus raising questions about the future of the cultural sphere as a whole and new forms and shapes that it might transform into.

Researchers such as Bailey, Deveraux, Nguyen have emphasized that culture is more of a fluid ecosystem rather than a monolith whole. There are many moving and changing parts in this system that are constantly interacting. COVID-19 pandemic is changing how different elements in this

ecosystem are interacting. Pandemic changes financing and production of cultural products as well as dissemination of them. It is clear that the pandemic has changed the cultural sphere for decades to come.

It is evident that many face to face cultural events have been stalled thus dramatically cutting the financial flow putting cultural institutions and creative professionals in a difficult position. One of the most common answers to this challenge has been the digitalization of the production and dissemination of cultural products.

The aim of this paper is to define the challenges that are in front of the cultural ecosystem. Survey the successful projects of digitalization and model scenarios of the future of cultural sector.

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DISCIPLINĒTA ĶERMEŅA ESTĒTIKA UN NORMATĪVISMS PADOMJU LAIKA SPORTA PLAKĀTĀ

Atslēgvārdi: plakāts, sports, ķermenis, afekts, sociālistiskais reālisms

Pētot ķermeniskuma aspektus mākslā, nākas novērot likumsakarības kādas pastāv starp noteiktas kultūras, laikmeta vai ideoloģijas diktētiem cilvēka ķermeņa standartiem, un to, kā šis pieņemtais normatīvisms atbalsojas vizuālajā kultūrā un mākslā. Starp cilvēka „dzīvoto ķermeni” un ķermeņa tēlu, ko indivīds rada citiem un kādu manifestē sabiedrībai, ļoti bieži pastāv dziļa plaša. Padomju laika plakāts parāda, kā sociālistiskais reālisms definē ideālo un vienlaikus tipisko cilvēku, iedomātu laikabiedru, kura tēls lielākoties neatbilst vai ir pretrunā ar ķermeņa realitāti, kādu piedzīvo indivīds. Pagājušā gadsimta 50. un 60. gados, kas sakrita ar t.s. Hruščova „atkušņa” laiku, tieši fiziskā kultūra un sports kļuva par nozīmīgu darbaļaužu ideoloģiskās audzināšanas instrumentu. Idejas izplatību un vizualizāciju nodrošināja uzskatāmā aģitācija, tostarp, plakāts. Sports kā ideoloģiskais ierocis, kā valsts politiskās varas propogandas līdzeklis dažādās interpretācijās funkcionē katrā sabiedrībā, tas darbojas visās vizuālās kultūras jomās un medijos. Arī padomju Latvijā īpaša vērība tika pievērsta uzskatāmās aģitācijas materiāliem – vides objektiem, plakātiem, sienu gleznojumiem, specifiskiem „goda dēļiem”. 1962. gadā pēc LPSR komunistiskās partijas prezidija lēmuma tika dibināta „Sporta un fiziskās kultūras propagandas federācija”, kas veica politisku pasūtījumu māksliniekiem, definēja tēmas, norādīja kas un kā būtu jāatveido glezniecībā, tēlniecībā, grafikā, kā arī fotogrāfijā un plakātā. Sporta plakātam bija jāprezentē nīčeāniskais pārcilvēks. Fiziski attīstīts, spēcīgs ķermenis, kas iemieso un reprezentē valsti.

Referāta ietvaros autore piedāvās sporta un fiziskās kultūras tēmai veltīto plakātu interpretācijas. Uzmanības centrā tiks izvirzīts ķermenis kā varas manifestācija, norādot uz disciplinēta un afektēta ķermeņa korelāciju.

Tēmas izpētei tika izmantoti Latvijas mākslas akadēmijas Informācijas centra krājumā esošā plakātu kolekcija, kuras apzināšana, atributēšana un digitalizēšana ir tikko iesākta. Līdz šim kolekcija nav prezentēta plašākai publikai.

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EDUCATIONAL ASPECTS OF THE MUSEUM EXHIBITION DESIGN - A CASE STUDY OF THE VILANI LOCAL RESEARCH MUSEUM

Key words: museum, exposition, design, museum pedagogy

The main mission of local history museums is not only to preserve the values of spiritual and material culture, but also to educate and promote interest and understanding of historical processes for the audience of students and people of another age. In order for the exhibition to receive attention and be able to convey the necessary information, it must be modern and digitized, easy to understand. During a pandemic, the museum must be flexible and able to offer exhibitions both indoors and outdoors and also in the digital environment.

Nowadays, one of the most important features of a modern museum is the availability of an educational program. Museum pedagogy has been developed not only in Latvia, but also in other Baltic countries with the rapid introduction of technology in both education and museum interactive exhibitions. The curators of the exhibitions and the directors of the museums, with the assistance of teachers, are looking for not only educational, but also engaging and exciting approaches to their development. Vilani Local History Museum also offers various museum pedagogical programs for children and students, which help to understand the importance of cultural heritage and expand their competencies.

Modern technologies helps to expand the range of museum pedagogy activities and create a wider interest of students. This type of activity not only develops the student's interdisciplinary skills, but also encourages creativity. The use of technology in the creation of the museum's exposition, provides an attractive and engaging result, as well as helps to navigate the information / allows to present more information. Today, the museum has changed its role - it is not only a collector and custodian of exhibitions and exhibits, but also a provider of an educational environment for social interaction.

The aim of the article is to determine the educational aspects of the design of the museum exposition, to define the criteria for the research of analogues and the development of a new museum pedagogical exposition for the Vilani Local History Museum.

Research methods: theoretical - literature, normative documents, Internet resources research and analog analysis; empirical - survey.

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EIGHT-POINTED STAR: IMAGES AND MEANINGS IN THE ART OF JŪLIJS MADERNIEKS

Images of eight-pointed star (regular octagram) play a major role in history of Latvian culture. Eight-pointed star visual representations appeared during national awakening in late 19th and early 20th century, as it was extensively used in visual and decorative art in between wars, also it played a role in exile and restoring national independence in 1980s.

In general ornaments are clearly essential to Jūlijs Madernieks - he published his collection "Ornaments" in 1913, that caused a lot of discussion, however there were no eight-pointed stars present, although J. Madernieks knew about them as he studied ornamented ethnographic textile in Riga Latvian Society museum. Even more - in 1904 he published examples of national dress and there, eight-pointed star was already among recommended ornaments.

Extensive representation of eight-pointed star is visible in J. Madernieks ornament collection "Raksti", published in 1930, and shown as an important ornament type, but in some representations had a patriotic connotation. In the same way J. Madernieks uses eight-pointed stars in Cabinet of

Ministers interior (1925–1926), also in Vidzeme Artillery Officers club furniture design. Eight-pointed star for J. Madernieks is just a modern ornament with loose connections to ethnography and rarely has patriotic meaning.

J. Madernieks has been called the founder of Latvian design and applied art, and had a wide range of followers especially among weavers, thus he contributed largely to the creation of eight-pointed star as a “Latvian” symbol.

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HISTORY OF KITCHEN INTERIOR DESIGN IN LATVIAN CITY HOUSING FROM THE BEGINNING OF THE LAST CENTURY TO THE PRESENT DAY

The aim of this report is to have a better understanding of how modern kitchen has developed in Latvia. The kitchen have been vital to the well-being of the residents in any times. Change in social life, politics and economic trends had a major influence on the design and function of the kitchen in the houses from the beginning of 20 century till our days. Technological advancements were constant, most of which aimed to reduce labor and time. It is predominantly the last century in which domestic kitchens have evolved and progressed to the concept we know today... A hundred years ago the kitchen was a utilitarian space, existing for food prep and little else. At the beginning of the last century, many innovations appeared in the kitchens of Riga as one of the most developed cities in Europe. The economic settlements of the working class and the creation of their kitchen, which was featured in the exhibitions, were also considered. With the constant innovation of appliances and ever-changing styles, kitchens over the past century showcase the evolution of our habits and lifestyles, transitioning from sparse workstations to colorful modular spaces to the sleek, airy rooms that are popular today. Open-concept homes—and their center islands with seating—have turned the kitchen space into a multipurpose room as much as a place for cooking, combining dining room, lounge, and living room in one. The author uses exhibition catalogues, archives and periodical materials, memory records, and resources found on the Internet in her study.

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MIXED TECHNIQUES IN CONTEMPORARY ART: EXPERIMENTS, UNUSUAL CONNECTIONS OF DIFFERENT MATERIALS IN PAINTING

Key words: *mixed media, painting, contemporary art, contemporary artists, experiments in painting*

Today a variety of painting techniques are used in art that can give to an artist a style that can be recognized around the world. Mixed techniques is one of the most popular ways of the 21st century, where you can experiment with paint, various industrial and construction materials, as well as with various natural ones to make new discoveries in painting, so that their works look more unusual compared with others.

The availability of different materials allows you to create, experiment and discover all kinds of unusual connections. It is easier for artists to express themselves and find their own special style. For example, Latvian and world painters such as Laima Bikše, Kaspars Teodors Brambergs, Mēir Srebriansky, Hannah Scott work on a variety of unusual techniques, combining different materials such as oil, acrylic paints, powders, and even polyester resins.

The aim of the research is to study Latvian and world contemporary artists who work in mixed techniques, experimenting with different materials, such as: candles, oils, acrylic paints, combining them together and creating unusual connections.

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MODERN CERAMICS OF LATGALE

At this time, handicraft ceramics has flowed into the current of Modern Art, moving by leaps and bounds in this direction – rushing towards the image of Modern Ceramics – within the framework of Modern Art. Baltic, Latvian, Latgale Ceramics is not far behind these trends, and in a sense even ahead of them.

Specifically, the Daugavpils Mark Rothko Art Center has a significant influence on Contemporary Latgale Ceramics, intertwining, touching and uniting the trends of Contemporary Art and Contemporary Ceramics. In this region, Ceramic Symposiums of International Importance take place, we organize with the support of Valentin Petko, a well-known ceramics expert outside the region, allowing both young Ceramics and indigenous experienced Craftsmen to develop in this direction.

Over the last, almost 10 years now, this symbiosis of Ceramics and Modern Art has significantly increased the artistic and cultural level of Latgale.

Tasks. In this scientific work, I want to consider in more detail the path of development of Modern Ceramics in Latgale, highlight the name of Valentin Petko and his contribution.

And also to acquaint you with other, no less famous Names, Organizations, Associations, in addition to the Rothko Center, involved in the development of Modern Ceramics in Latgale, such as MMS (Mākslas un Māla Centrs) – in Daugavpils, Amatniecības Centrs with the support of Valdis and Olga Paulini – in Krāslava, to acquaint with the activities of Evia Vasilevskaya in Malta and others.

Also, this scientific work includes an analysis of the Plein Air activities at Ceramic Symposiums, interviews with organizers and curators.

Motivation and target audience

This topic characterizes and outlines from different sides a whole historical period in the life of Latgale Modern CERAMICS, and will be interesting and useful: both for developing Authors and for the cultural layer, contributing to the historical heritage of Latgale, fixing an important period in the development of our Region.

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TECHNIQUES, MATERIAL USAGE IN INTERIOR PAINTINGS IN THE 21ST CENTURY

Key words: material, artistic imagery, techniques, interior painting

Nowadays with all the possibilities of technological development physical and interior paintings are trending. Their uniqueness has not been lost. In the 21st century art boundaries are often blurred between design and art. Beauty, functionality, and contemplativeness can be achieved through any artistic position. Interior paintings are in demand especially in today's market. What exactly are interior paintings? Can they be considered artwork in themselves and be appealing for the viewer or are they just an element of design. Interior paintings potentially enhance a variety of different environments; they are also versatile within a given space. They can be the focal point if necessary or can be utilized in a way that its formal qualities alone converse with the space, allowing viewers to contemplate the art within the larger context of the environment. Interior paintings describe the aspect of various nature imaginary suitable for decoration. Artists present the content of work by using: graphic elements, nature motives, abstractionism, variations of ornament motives or creative imageries, and pastel tones. The aim of this research is to find representative artists not only in Latvia

but all over the world, furthering detailed research of interior paintings and in which ways they work. Also looking into what kind of materials the artists use and motivational techniques that are represented in the paintings.

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THE PRECONDITIONS FOR THE CREATION OF A SUCCESSFUL TEAM IN A CULTURAL INSTITUTION: STRATEGIC LEADERSHIP ROLE

Key words: a cultural institution, a leader, a team, a strategy, creativity

In a contemporary cultural institution, not only is a thoughtful hierarchy of the organization concerned as an important factor in its development, but also a strategically minded and creative leader with the ability to build a team of successful professionals, to create synergies and to achieve the objective and tasks assigned to the cultural institution. Progressive leaders develop their leadership skills and qualities throughout their professional careers, continually continuing personality growth, demonstrating a desire to improve and setting an example for the team. There is a certain fact that even very successful teams, characterized by successful cooperation between individuals, cannot function appropriately without a leader. If the work that is done together is not shared into specific tasks considering each team member's ability, and the team members feel responsibility for everything, the team is not productive. The composition of the team must be diverse in order to ensure a symbiosis of different experiences, knowledge, skills and competences for achieving a common goal. Being able to work effectively and communicate openly within the team is a prerequisite for both the team development and a sustainable outcome. The aim of the research is to identify the prerequisites for the creation of a successful team and the role of leader in a contemporary cultural institution

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VISUAL TRANSFORMATION OF THE URBAN ENVIRONMENT DURING THE COVID-19 PANDEMIC: ARTISTIC ASPECT

During the Covid-19 pandemic, residents of Latvian cities are required to comply with various conditions to reduce human morbidity. On the one hand, measures are being taken to look after people's health. Restrictions have a negative effect on people's well-being, mood and ability to work. Overloading emotional health can lead to serious illness. Light promotes a positive attitude, optimism and spiritual balance, so one way to cheer people up is to creatively change the urban environment by taking advantage of artistic lighting in the dark. Parks shine in the city, important objects radiate light and allow to understand the meaning of symbols, and the impersonality of the urban environment disappears. The festival of light 'Staro Rīga' has become highly anticipated among Rigans. In the streets, parks, squares, art objects can be seen, encouraging to see the famous places of Riga in a new light. In the city of Valmiera, several parks are being turned into Gardens of Light. The artist's creative goal is to emotionally engage the viewer so that there is room for reflection, feeling and completely new insights. The tendency to illuminate the urban environment and create changes has taken over Latvia.

Research goal: to analyze the diversity of priority measures for the care of human health in the natural and urban environment.

Research problem: to emphasize special places, symbols of national significance and creating pedestrian routes that promote entrepreneurship in the visual transformation of the urban environment.

Research methods: analysis of different urban plans and local traditions and understanding of artistic values.

Practical implications: positive experiences of entrepreneurship and priority actions for human health can further inspire new, creative ideas.

Originality: differences in the expression of creativity for performing visual transformations for the care of human health in the natural and urban environment in different cities in Latvia are analyzed.

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BIOLOGY

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RECENT DISTRIBUTION OF NAJAS MINOR AND NAJAS FLEXILIS IN LITHUANIA

The genus *Najas* L. (Hydrocharitaceae) in Lithuania is represented by four species: *Najas major* All., *N. marina* L., *N. minor* All. and *N. flexilis* (Willd.) Rostk. & Schmidt. *N. minor* and *N. flexilis* are protected species in Lithuania, in addition, *N. flexilis* is listed as protected species in Annexes II and IV of the EU Habitats Directive. However, little is known about their true distribution, peculiarities of biology and ecology. Because these aquatic plants are annual, it is important to understand their ecological requirements, to ensure their potential for survival in a changing environment.

In Lithuania *N. minor* is known since 1822, whereas *N. flexilis* discovered accidentally in herbarium specimen of stonewort collected in 1966. Most of the already known *N. minor* localities are concentrated in the north-eastern part of the country, except one location in south-eastern part. *N. flexilis* was known in two lakes, that are located in western and eastern parts of Lithuania.

During the period 2019–2021 we conducted a search of *Najas flexilis* and *Najas minor* in 25 lakes situated in the territory of Lithuania. We monitored known localities of these species, as well as other lakes with similar ecological conditions to known sites. *N. flexilis* was recorded in 3 new sites, thus in total species now is known from 5 lakes. *Najas minor* was recently found in 4 new localities and now there are 8 confirmed sites for this species in Lithuania.

Lakelands in the eastern part of Lithuania remains the key area for protection of these two threatened *Najas* species. Special investigations of newly found and long-known populations of *N. minor* and *N. flexilis* are necessary for better understanding of species biology and ecological requirements to ensure their survival and effective protection.

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ABUNDANCE AND DISTRIBUTION OF THE PHILIPPINE BROWN DEER (*RUSA MARIANNA*) IN THE OBU MANUVU ANCESTRAL DOMAIN, DAVAO CITY

The Philippine Brown Deer (*Rusa marianna*) is an endangered species endemic to the Philippines. Deforestation, habitat loss, and subsistence hunting continue to cause its rapidly declining population. To increase knowledge on deer's conservation and population status in Mindanao, the researchers assessed its abundance and distribution within the Obu Manuvu Ancestral Domain (OMAD) in Davao City from January to March 2020. Camera trapping was used to detect deer presence and calculate its relative abundance index (RAI). A total of ten (10) cameras were installed in areas with preliminary evidence of deer presence, such as trails, dens, and fecal pellets, and were distributed at 250m minimum distance intervals. Key Informant Interviews (KIIs) were undertaken to document local conservation efforts. A total of 4 deer individuals were observed after 500 camera trap days

(RAI=0.8). Two individuals were recorded in Barangay Carmen (RAI=1.6), 1 in Barangay Salaysay (RAI=0.8), 1 in Barangay Tawan-tawan (RAI=0.8), and 0 in Barangay Tambobong (RAI=0.0). Overall, the deer has a very low RAI and broad distribution across primary and secondary forests located at an elevation of 1518 masl to 1709 masl. Meanwhile, hunting and habitat loss remain the leading anthropogenic threats to the deer despite local conservation efforts by the Obu Manuvu indigenous community. Thus, there is a need to strengthen conservation efforts through the stringent implementation of wildlife monitoring and enforcement of culture-based protection policies.

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BIOCONTROL POTENTIAL OF BJERKANDERA ADUSTA AND SISTOTREMA BRINKMANNII AGAINST HETEROBASIDION SPP. PRIMARY INFECTIONS

One of the most efficient methods to control *Heterobasidion* root and butt rots is based on treatments of freshly cut coniferous stumps with biological or chemical products. Biological preparations based on the fungus *Phlebiopsis gigantea* are widely used in Europe as stump treatments against *Heterobasidion* spp., but these are more effective on pine stumps than on Norway spruce stumps. In the present study, we tested different Latvian isolates of *Bjerkandera adusta* and *Sistotrema brinkmannii* for their antagonistic potential *in vitro* against both *H. annosum sensu stricto* and *H. parviporum*, using native isolates of *P. gigantea* and Finnish Rotstop® as controls. The best isolates were chosen using several features: growth rate on agar, antagonistic ability against *Heterobasidion* spp. and oidia production. Some of the *B. adusta* and *S. brinkmannii* isolates performed similarly to *P. gigantea* isolates.

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DETECTION OF ANTIBACTERIAL RESISTANCE IN E. COLI ISOLATED FROM WOUND IN THE HOSPITAL OF TRAUMATOLOGY AND ORTHOPAEDICS

Background: According to EARS-Net 2019 data of antibacterial resistance, the most commonly reported bacterial species were *E. coli* (44.2%). More than half of the *E. coli* isolates were resistant to at least one group of supervised antimicrobials, and combined resistance to several groups of antimicrobials was common. These data points out that the *E. coli* strain is becoming more resistant and that multidrug resistance is on the rise. Antibiotics are becoming increasingly ineffective as drug resistance is spreading around the world, leading to more difficult infection treatment. So it is really important to keep up with antibacterial resistance, it may help to lead scientists to new antibacterial treatment options.

Aim: The aim of the current study was to determine antibacterial resistance of *E.coli* isolates from wounds.

Methods: Samples were taken from various wounds of clinical patients. Tasks were: to identify isolates from wounds by *BBL™ Crystal™ system*, to perform antibacterial susceptibility tests using the *Bauer-Kirby™* disc diffusion test and *E™-test*, to phenotype isolates by antibiogram. The ESBL was established by using double disc synergy test, combined disc method and *E-test*. The results are summarized using *MS Excel 2016*, statistically analyzed by *SPSS*.

Results: From all 45 patients in 2021 *E. coli* isolates from wounds most commonly were susceptible against gentamicin – 86,7% (n – 39) (p < 0,001); amoxicillin/clavulanate – 80% (n – 36) (p < 0,001) and ceftazidime – 73,3% (n – 33) (p < 0,001). In contrast, the highest resistance of *E. coli* isolates was detected to ampicillin – 62, 2% (n – 28) (p – 0,101). The ESBL was also detected and the result was 24, 4% (n – 11). 60% (n – 27) of *E. coli* isolates showed multidrug resistance.

Conclusions:

1. *E.coli* isolates showed the highest susceptibility to gentamicin – 39 isolates (86,7%), it was a statistically significant result, in contrast to 28 (62,2%) isolates, which were resistant to ampicillin.
2. ESBL was detected in 11 (24, 4%) of all isolates.
3. Of all *E.coli* isolates n – 45, MDR was detected in n – 27 (60%), meaning that resistance to two or more antibiotics was detected.

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DOMINANCE OF FRUCTOSE-ASSOCIATED FRUCTOBACILLUS IN THE GUT MICROBIOME OF BUMBLEBEES (BOMBUS TERRESTRIS) INHABITING NATURAL FOREST MEADOWS

A vast array of microorganisms colonize invertebrates and vertebrates. Most of these microbes reside in the digestive tract, where they constitute the intestinal (gut) microbiome. Some microbes are commensal, coexisting with their host without causing harm, while others can be mutualistic or pathogenic. Mutualistic microorganisms perform many health-related functions such as promoting digestion and acquisition of nutrients; hormone regulation; maintenance and control of the immune system; regulation of homeostasis and stress physiology of the body; insecticide resistance; production of certain vitamins; and providing protection against pathogenic microorganisms, parasites, and diseases. Bee-specific bacterial genera such as *Lactobacillus*, *Snodgrassella*, and *Gilliamella* dominate the gut communities of many bumblebees. This study confirmed *Lactobacillus*, *Snodgrassella*, and *Gilliamella* as dominant gut bacteria of the buff-tailed bumblebee *Bombus terrestris* in the agricultural landscape. However, we show that the guts of *B. terrestris* from natural forest habitats can be dominated by fructose-associated *Fructobacillus* spp. Our findings may have important implications for understanding the ecological role of bumblebees and the reasons for the decline of key pollinators.

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EFFECTS OF IRON OXIDE NANOPARTICLES ON THE GROWTH AND CHLOROPHYLL SYNTHESIS IN ROCKET (*ERUCA SATIVA* MILL.)

Eruca sativa Mill., also known as arugula, garden rocket, or rucola, is a vegetable whose consumption is very popular worldwide. Rocket salad is economically relevant, and rocket is actively cultivated in Mediterranean countries as well as in other countries on all continents. The rocket is distinguished by its excellent nutritional properties, such as high content of glucosides, flavanols, mineral salts, vitamins A and C, antioxidants and its pleasant bitter taste. Besides, it is known that photosynthesis is an essential biological process that is highly related, among others, with crop yield. At the same time, very popular and important topic for studies worldwide, due to increasing nanoparticle (NP) use, is nanoparticles' impact on environment, including plants, animal and human being. This has motivated the investigation of the effects of iron oxide (Fe_3O_4) NPs on rocket *Eruca sativa* Mill. seedlings grown in hydroponics.

Different Fe_3O_4 NP concentrations, such as 1, 10 and 50 mg/L, were added to two-week old rocket seedlings. After another two weeks, measurements of rocket seedlings' length and biomass were obtained, and content of chlorophyll *a* and *b* was measured. Finally, photosynthesis marker gene and stress-related gene expression was quantified by RT-qPCR.

The obtained results demonstrate the possibility of utilization Fe_3O_4 NPs in a certain concentration for breeding of rocket, increasing chlorophyll synthesis and consequently yield. The future research of rocket nutritional content is needed to verify Fe_3O_4 NP capability to increase crop productivity, quality and to improve crop conservation strategies. This study was supported by Daugavpils University internal grant No. 14-95/2022/25.

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EVALUATION OF GC VITAMIN D BINDING PROTEIN GENE POLYMORPHISMS AS POSSIBLE GENETIC MARKERS FOR MULTIPLE SCLEROSIS IN LATVIAN POPULATION

Background. Vitamin D is a hormone that has functional and regulatory effects in the body. It plays an important role in the pathogenesis of different immunity-related diseases, such as multiple sclerosis. Vitamin D acts through binding to a specific vitamin D binding protein (DBP), which is expressed in a variety of tissues. GC (Vitamin D Binding Protein) gene is genetically highly polymorphic. Genetic variants rs7041T/G and rs4588C/A of the GC gene have also been studied as potential risk factors for vitamin D deficiency. The GC rs7041 genotype was found to alter vitamin D metabolism.

Aim. To determine the prevalence of GC (rs7041 and rs4588) genetic polymorphisms in Latvian population and to evaluate its possible functionality in order to analyze their applicability as molecular markers.

Methods. Genotyping of 253 DNA samples of Latvian population representatives was made using allele-specific PCR and restriction enzyme site polymorphism method. Literature and sequence data on GC gene polymorphisms were analyzed using meta-analysis and bioinformatical tools for DNA and RNA secondary structure, DNA bending, and transcription factor binding sites.

Results. All studied SNPs demonstrated allele-dependent alternative secondary structures. Differential structures of DNA and/or RNA were found. Marked differences in simulated DNA curvature and bendability depending on allele were observed.

In the Latvian population, the minor allele frequency (MAF) of rs7041 and rs4588 corresponds to 52% and 38% and prevails in comparison with the general European population (43% and 25%, respectively). There is information on their associations or linkage with different diseases in different populations.

Conclusion. Meta and bioinformatic analysis of selected rs7041T/G and rs4588C/A of CG vitamin D binding protein gene illustrate the potential of using them as possible molecular markers by genotyping in association study.

Interactions of these polymorphisms with the GC gene methylation status and vitamin D levels in various disease cohorts in Latvians are planned in future studies.

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EVALUATION OF YIELD OF HEMP VARIETIES

Key words: *industrial hemp, seed hemp, hemp varieties, hemp yields, quality, fiber, shives*

Industrial hemp (*Cannabis sativa* L.) is very unusual in terms of product variety. From their bark, cores, leaves and seeds, raw materials are obtained for the production of various products. Hemp fiber is considered to be one of the best natural fibers in the textile industry. Cannabis seeds are rich in oil. Depending on the variety and growing conditions, the oil content of the seeds is 30–35% or more. Consisting of 10% saturated fatty acids and 90% unsaturated fatty acids. (Strazds, Stramkale, Laizāns, 2012). Cannabis seeds contain proteins that are easily assimilated by the body. Expanding the use of cannabis-derived products is a promising development in the world and can provide a basis for sustainable economic growth based on naturally renewable resources. The tasks set in the Latvian Bioeconomy Strategy for 2030 require maximizing the use of Latvia's renewable natural raw materials in the production of various industrial, food and feed products. According to the data of the RSS, in 2020 in the area of 881 ha of cannabis growers and in 2021 – in the area of 859 ha. Field trials were carried out in Eastern Latvia in 2020, 2021 with a view to 'To study the suitability of different varieties of industrial hemp for fiber production in Latvian agroclimatic conditions'. Within the project, five varieties of seed hemp ('Adzelvieši', 'Pūriņi', 'KA-2-2011', 'Finola', 'Henola') and three fiber hemp ('USO-31', 'Futura 75', 'Austa') were grown. Sowing rate 60 kg ha⁻¹. Mean air temperature and amount of precipitation were assessed during hemp growing period from April to September. Data from Rezekne Hydrometeorological Station were used to characterize meteorological conditions. For description of growing conditions of hemp hydrothermal coefficient of Selyaninov(HTC) has been used, it is correlation between amount of precipitation in the time period, when average day temperature exceeds +10°C, and summary of temperature in degrees in the very same period. Yields of fiber, seeds, shives and total stalk were determined during the research. For statistical data evaluation the statistical software developed was used ANOVA method applied.

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GENETIC STRUCTURE OF CURRENT COREGONUS ALBULA (L.) POPULATIONS AS POSSIBLE RESPONSE TO MULTIPLE TRANSLOCATIONS IN THE PAST

The European vendace (*Coregonus albula* (L.)) is a widespread species in northern part of Europe and is often treated as one of the glacial relicts of the animal world. Vendace belongs to economically valuable fish species. Artificial propagation of vendace had been held in Latvia since 1900. Currently, despite larvae and fry translocations in the past and vendace protection status nowadays, it can be found in no more than 15 Latvian lakes. The present research used nine microsatellite markers to study vendace populations from nine Latvian lakes. A higher mean allelic richness and private allelic richness in Lake Rīču suggests that this vendace population is indigenous. Three clustering methods reveal similar grouping into three genetic groups. Most likely at the present time the vendace populations of investigated Latvian lakes seem to be a “mixture” of several populations and therefore may not be fully indigenous.

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IMPACT OF DIFFERENT NANOPARTICLES ON WHEAT (TRITICUM AESTIVUM L.) PLANTS, COURSE AND INTENSITY OF PHOTOSYNTHESIS

Nanoparticles (NPs) accumulate in plants and affect photosynthetic reactions by altering the composition of proteins in the electron transport chain, chlorophyll biosynthesis, and carbohydrate synthesis reactions. NPs affect plant growth by altering the size of leaves and roots. Positive or negative effects are determined by the size, concentration and starting material of the NPs. Plants play an important role on Earth as nutrient producers in all trophic food webs by producing the oxygen, absorbing carbon dioxide and synthesizing edible carbohydrates during photosynthesis.

In this study, iron III oxide (Fe_3O_4) and zinc oxide (ZnO) NPs, at various concentrations (0,1,2,4 mg/l), are used in common wheat (*Triticum aestivum* L.) to investigate the effect of NPs on plant morphological parameters and photosynthesis intensity, determining the amount of chlorophyll and the absorption of their light spectrum. The results show that longer leaves and root structures were observed in plants exposed to ZnO and Fe_3O_4 nanoparticles compared to the control group. The results of extracted plant chlorophyll solution spectrophotometry also showed an increase in absorption. The samples with ZnO NPs and concentration 1 mg / l showed the highest absorption rate and highest total chlorophyll content.

Other studies have also shown that low concentrations of zinc and iron oxide NPs accelerate plant growth, improve seed germination, increase chlorophyll content, promote development, flowering and promote leave, root growth. Highest concentrations of NPs (50 mg /l) create cytotoxicity and genotoxicity.

This study will make a major contribution to understanding the effect of low concentrations of NPs on plant seedlings. Currently, NPs with high concentrations starting from 10 mg / l are analyzed. In the environment, nanoparticles enter plants in low concentrations as dust or through water droplets. Therefore, it is important to determine what is potential impact of small NPs.

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NATURA 2000 MARINE BENTHIC HABITATS IN LATVIAN COASTAL WATERS: IDENTIFICATION AND CHALLENGES

The Baltic Sea is small by its territory but one of the world's largest brackish waterbody with very sensitive and changing ecosystem. The Habitats Directive(92/43/EEC) lists nine habitats that require the designation of special areas of conservation. We considered that in Latvian coastal waters two of these biotopes need more attention and interpretation - "1110 Sandbanks which are slightly covered by sea water all the time" and "1170 Reefs". Expanded definitions are crucial to correctly establish assessment system of hard and soft bottom biotopes quality evaluation.

There are seven marine protected areas in Latvian coastal waters that mostly consist of hard substrate biotopes-reefs and occupy area of 4360 km². Reefs have evident ecological zonation defined by depth and associated with vegetation and benthic animals. However, no territory is assigned special protection status for sandbanks because of the lack of clear definition that would describe the real conditions in Latvian coastal waters. Sandbanks are defined as topographic features that are slightly covered with water not deeper than 20m and usually associated with macrovegetation. Nevertheless, we have identified such structures from the shoreline to deeper offshore zones with no vegetation that only partly meet the regular definition. Sandbanks can be often found in association with reefs and often in Latvian coasts biotopes are patchy; reefs are mixing with soft bottom substrates.

We suppose that due to long term anthropogenic influence on benthic biotopes, they frequently do not meet good environmental status and are degraded, furthermore loss of some typical species could occur. Expanded definition of reefs and sandbanks adapted to the situation of Latvian coastal waters has been developed and bottom communities were described in depth range 5–35m. Funded by LIFE project "LIFE REEF No. LIFE19 NAT/LV/000973".

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PROXIMITY TO WATER BODIES EFFECT ON THE BLOOD PARASITE INFECTION RATE, REPRODUCTION AND FITNESS OF THE EUROPEAN PIED FLYCATCHER (FICEDULA HYPOLEUCA PALLAS, 1764)

Animals aim to live and reproduce in such habitats that provide sufficient food amount and hideaway from predators. But, while animals are attracted to rich sources of food, their reproduction and survival might be influenced by different other environmental factors, e.g. blood parasites. They are supposed to have a severe negative impact on the health condition of their hosts. This is connected with the distance from host habitats till water bodies where the vectors - bloodsucking insects, of blood parasites reproduce.

In this study researchers tested for links between haemosporidian infection prevalence, parasitemia (the intensity of infection) and other health condition indicators of European Pied Flycatchers (*Ficedula hypoleuca* Pallas, 1764) in their breeding season at different proximity from water bodies in the forest. It was discovered that the infection prevalence, haemosporidian parasitemia and occurrence of vectors declined in general with distance increasing from the forest water bodies like lakes, streams and swamps. Also the number of bird fledglings and the measured parameters of their condition – body mass and tarsus length, had a positive correlation with the distance to the water bodies. This means that fledgling amount was lower and their fitness parameters decreased near the water bodies. At the end of the breeding season the number of blood-sucking insects had a negative correlation with the distance to the nearest water body, while the adult bird body mass was significantly lower closer to water bodies.

This study suggests that more research needs to be done in order to explain the role of different blood parasite types and their vectors in birds overall health condition parameters mitigation. It is recommended to avoid placing bird nest boxes around forest water bodies in order to decrease the impairment, which is done by cavity-nesting birds, e.g. European Pied Flycatchers who select non-adaptive habitats that appear to be ecological traps for these birds. This kind of damage might have conservation implications for different bird species.

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SHORT-TERM IMPACT OF FERTILIZATION ON TREE GROWTH DEPENDING ON DOMINANT SPECIES AND FOREST SITE TYPE

Key words: forest fertilization, ammonium nitrate, wood ash, volume increment

The demand for woody biomass-derived energy is increasing, since it is a sustainable alternative for fossil fuels and has a potential to mitigate climate change. Fertilization is a useful silvicultural practice to improve tree growth and to increase timber output. Forests on mineral soils are mostly fertilized with nitrogen-containing fertilizers, whereas peatland forests require potassium and phosphorus fertilizers.

This study evaluated the impact of fertilization on forest stands representing different site types and dominant tree species. Fertilization experiments were carried out in 64 forest stands all over Latvia. Wood ash was spread in spruce stands with organic and mineral soils. Ammonium nitrate was spread in mature pine, spruce and birch stands, as well as in middle-aged and young stands considering repeated fertilization after thinning. Both ammonium nitrate and wood ash were applied as a complex fertilizer in pine, spruce and birch stands with drained organic and mineral soils and moist mineral soils.

In all the experiments, except for the stands, where growth had been significantly affected by natural disturbances, the applied fertilizer provided a significant additional increase of the stock compared with the control areas already during the first 2–3 years. The most stable additional increment regardless of forest type, tree dimensions and distance between trees was found in pine stands, but in spruce stands additional increment was found in peat soils fertilized with wood ash and mineral soils, where the complex fertilizer had been applied.

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SUBSTRATE PREFERENCES OF BRYOPHYTES ALONG BLACK ALDER SWAMP FOREST CHRONOSEQUENCE

Black alder swamps are diverse forest habitats that contain a variety of suitable substrates for bryophytes. The aim of the study was to investigate bryophyte diversity on different substrates along forest stand chronosequence. Bryophyte species were studied in 30 black alder swamp forests in three forest age classes: young (20–30 years old), middle-aged (50–60 years old) and old-growth (>100 years old) forests. Bryophyte species were recorded on the ground, living trees, and logs along 28 m long transect within two meters of both directions from the transect. Bryophyte species that were not already recorded on mentioned substrates, were additionally recorded on stumps. Bryophyte species number increased with forest age. There were no significant differences between bryophyte species number among different substrates within the old and middle age forest classes. Significantly lower species number was found on logs within the young forest age class that can be explained by the lower availability of logs in younger forests. Epixylic species on the youngest forest stands were found on older stumps. Our preliminary study shows that the availability of substrate is one of the key factors that affect bryophyte species diversity in black alder swamp forests. The presence of deadwood can increase the diversity of bryophyte species in young black alder swamp forests. The next step will be a more detailed analysis of changes in bryophyte species and their functional groups in relation to substrate characteristics.

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THE ASSOCIATION BETWEEN THE LIKELIHOOD OF CALVES HAVING CRYPTOSPORIDIUM SPP. AND FACTORS RELATED TO COLOSTRUM QUALITY

Colostrum is an exceptionally complex secretion that contains more than 250 various active chemical compounds. The ingestion of an adequate volume of high-quality colostrum is one of the most important factors influencing the health and survival of dairy calves because it provides passive transmission of immunity from cow to calve. The effect of colostrum on calves' health status was intensively studied while the role of transition milk was left underestimated. The common practice is to feed calves with an adequate amount of colostrum immediately after calving and soon after feeding calves are weaned from dams. In this research, calves were not weaned from dams for at least 2 weeks receiving both colostrum and transition milk on demand. Thus, we have recreated natural feeding conditions for calves' development. We used a stratified sample method to test whether the size of the dairy cattle farms, breed, parity number, season of calving and length of the dry period affects the likelihood of calves' infection with *Cryptosporidium* spp. considering these factors influence both colostrum and transition milk quality. The main results showed that 26.1% of calves were positive for the presence of *Cryptosporidium* spp. oocysts. The presence of clinical signs of diarrhea was recorded in 15% of the positive animals. Regression analysis showed that multiparous cows decrease the chance of calves to have *Cryptosporidium* spp. by 82% – 89% while cows calved in small farms decrease the chance of calves to have *Cryptosporidium* spp. by 80%. We suggest that primiparous cows are spending inner resources primarily on their maturation thereby leaving the prerequisites for the infection of their offspring while intense farming just increases the chance of unprotected calves to obtain infections.

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THE CONTRIBUTION OF BLACK ALDER SWAMP FORESTS IN BRYOPHYTE SPECIES DIVERSITY AND CONSERVATION

Black alder (*Alnus glutinosa* (L.) Gaertn.) is important species in forestry, but it also has a high ecological importance. Old-growth black alder swamp forest is protected habitat in European Union. Black alder forests are continuously influenced by groundwater that shapes also vegetation. Bryophytes form an integral part of vegetation in the black alder swamp forests. The aim of our study was to evaluate the importance of black alder swamp forests in bryophyte species diversity and conservation. We studied bryophytes in randomly selected 30 sample plots in black alder forests within three forest stand age classes (young, middle, old). In these plots we selected and determined bryophyte species on living tree bark, deadwood and soil. Many bryophyte species were found in all forest age classes. In old forest stands we found five protected bryophyte species the bryophyte species diversity was higher than in younger forest stands. In middle age forests, we found five protected species. In the young forests we found only two protected species. In total we found seven protected bryophyte species. Our results showed that in 90% of forest stands older than 100 years, were found one to four protected bryophyte species. One to four protected bryophyte species were found in 60% of middle-aged stands. One to two protected bryophyte species were found in 20% of young forests. The study results indicate the importance of old-growth black alder forests in conservation of protected bryophytes.

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THE EFFECT OF INTENSIVE AGRICULTURE ON THE PHYSIOLOGICAL STRESS AND REPRODUCTION OF THE BUFF-TAILED BUMBLEBEE (*BOMBUS TERRESTRIS* LINNAEUS, 1758)

Habitat quality and multiple stressors affect free-living organisms in their habitats. It has been observed that intensification of agriculture influences diversity and abundance of pollinator insects, and it may have an impact on their body elemental content as well. In this study reproductive success, body concentration of carbon (C) and nitrogen (N), and C/N ratio were compared. All of them are considered as indicators of stress in the buff-tailed bumblebee (*Bombus terrestris* Linnaeus, 1758). Bumblebee colony hives were situated in oilseed rape fields (*Brassica napus* Linnaeus, 1753) and semi-natural apple tree (*Malus domestica* Borkhausen, 1803) orchards. In oilseed rape fields flowering season was longer than in apple orchards. Reproduction numbers were significantly higher in oilseed rape habitats in comparison to apple orchards, while the C/N ratio of queens and workers, which is an indicator of physiological stress, was lower in apple orchards. In the apple tree habitats bumblebees had significantly higher body N concentration. It was concluded that in oilseed rape fields, which is a more productive habitat overall, bumblebees have more possibilities to increase their fitness than in old apple orchards, which is more natural habitat. In this research physiological stress was observed as a significantly higher C/N ratio in bumblebees that were living in oilseed rape fields.

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THE FIRST ASSESSMENT OF THE LICHENIZED FUNGI FROM THE FAMILY PARMELIACEAE USING THE CRITERIA OF THE IUCN CRITERIA IN LATVIA

The lichenized fungi were never assessed using IUCN criteria in Latvia. The aim of our study was to evaluate 16 lichen species from family *Parmeliaceae* using IUCN criteria (ver. 3.1). All selected lichen species are included in the lists of the protected species of Latvia. The best available historical and up-to-date information was used for the obtaining data on species occurrences, which includes the historical literature, RIG and DAU lichen herbarium collections, and lichen occurrence data in Nature conservation Agency data management system "OZOLS". Species that have been assessed as CR, EN, VU are recommended to be included in the lists of protected species and to be protected.

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TRANSPLANTATION EXPERIMENTS OF RARE EPIPHYTIC LICHEN MENEGAZZIA TEREBRATA IN LATVIA

Epiphyte transplantation experiments in forest ecosystems offer wide range of opportunities to answer various questions in nature conservation and ecology. One of the important aspects in forest ecology today is to understand the species dispersal patterns and environmental conditions for species long-term existence in forest ecosystems. In the present study we aimed to evaluate the health of the rare lichen *Menegazzia terebrata* transplants in relation to substrate and habitat quality and deciduous forests in Latvia using digital photographs. We transplanted *M. terebrata* on low and high quality *Tilia cordata* trees in low and high quality deciduous forest habitats. In total we transplanted 80 *M. terebrata* transplants in 2020. We evaluated *M. terebrata* transplant health in 2021. Our results showed that *M. terebrata* health differs significantly within all substrate and habitat quality combinations, except good substrate and good habitat (control conditions). This shows that *M. terebrata* occurrence is highly dependent on local environmental conditions in old-growth forests. The study was financially supported by project: "Epiphyte metapopulation dynamics in boreo-nemoral forest landscape" (Nr. 1.1.1.2/VIAA/3/19/469).

KĪMIJA

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CHEMISTRY

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DETERMINATION OF SEASONAL CHANGES IN BIOGENIC ELEMENTS CONCENTRATION IN DAUGAVPILS CITY RIVERS

Pollution of the aquatic environment with biogenic elements, which clearly have a strong impact on water quality, is considered to be a very important problem. One of the most important research directions is the question of the amount of biogenic elements input, which is determined by the concentration of these elements and the intensity of the accumulation process in aquatic ecosystems.

The aim of the research was to determine the mass concentrations of biogenic elements and their compounds in Daugavpils city rivers: Daugava, Meļņička, Laucesa un Šūņupe.

At the beginning of this study, the following hypothesis was put forward: the mass concentrations of biogenic elements and their compounds in the rivers of Daugavpils city are characterized by sharp seasonal variations.

The topic of the developed research has a certain novelty, because so far the quality of Daugavpils city watercourses according to the mass concentrations of some biogenic elements has been studied in fragments.

During the study period, 60 water samples were collected and analyzed under field conditions. The methodology used in the work was mainly based on the following ISO methods: LVS EN ISO 5667-3, LVS ISO 5667-4, LVS EN ISO 11732, LVS EN ISO 15681-1 and LVS EN ISO 13395.

The obtained results show that the only parameter of the study that falls out of the overall seasonality trends is ammonium nitrogen.

The research data show that Šūņupe has the highest pollution indicators with biogenic elements. These facts are clearly influenced by the wastewater input of Daugavpils city, because similar values were not found in other rivers.

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DEVELOPMENT OF A METHOD FOR REDUCING THE CONCENTRATION OF TAR IN THE GENERATOR GASES OBTAINED IN THE PROCESS OF GASIFICATION OF BIOMASS

Generator gases are products obtained from the biomass gasification process and are receiving more attention from research because they are used as feedstocks in the production of second-generation biofuels.

The most difficult part of the production process is the purification of generator gases. Purification of generator gases from the gasification process from tars and other pollutants is a complicated and expensive process, therefore there is an increased demand from operators to determine the regularities between the chosen type of biomass and the pollutants arising from its gasification process.

The resulting producer gases require extremely low levels of pollution to reduce the negative impact on the expensive and sensitive catalysts used in the Fisher-Tropsch synthesis process, which have a tendency to poisoning and subsequent destruction in the presence of contaminants.

At present, there are producers of gas in Latvia, from which there is also an extremely high demand for new and sensitive analytical methods for the determination of contaminants in their products. However, there is still a lack of practical research at national level to meet this demand.

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DEVELOPMENT OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF POLLUTANTS IN INDUSTRIAL WATER USED FOR COOLING OF GENERATOR GASES IN THE BIOMASS GASIFICATION PROCESS

Recently, gasification plants have often been used in various types of waste disposal processes, thus reducing the amount of waste disposed of in landfills.

As gasification takes place at elevated temperatures, the generator gases generated in this process need to be cooled. The most convenient method of cooling involves the use of process water. As the process water comes into contact with the generator gases during the cooling process, some of their pollutants pass into the water phase (soluble or mix).

It is necessary to utilize the technological water, therefore before the utilization process it is necessary to make sure that the composition of the water complies with the parameters of wastewater, which are formulated in the Cabinet Regulation No. 34 "Regulations on the Emission of Pollutants into Water" (22.01.2002).

Therefore, it is vital to control the gasification process, as well as to analyze the composition of the technological water for pollution before utilization.

Pollution control is also needed to monitor ongoing gasification process parameters, which can be changed to reduce pollutant emissions. Qualitative and quantitative analysis of pollutants also helps to select more appropriate technological water treatment methods before disposal.

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IMPROVEMENT OF BIO-OIL YIELD AND QUALITY OBTAINED IN THE PROCESS OF WASTES PYROLYSIS

Waste is not only an environmental problem, but also a loss to the economy. The European population produces an average of 481 kg of municipal waste per year. More and more of this waste is being recycled or composted and less and less ends up in landfills. How can production and consumption be changed so that waste is reduced and existing ones used as a resource? Pyrolysis technology helps to solve the problem of environmentally hazardous waste management.

Pyrolysis liquid or bio-oil is a product obtained from the pyrolysis process of waste and, compared to other pyrolysis products, is receiving more attention from scientific research. Bio-oil, obtained from various types of waste, consists mainly of water, organic acids, various hydrocarbon compounds and other components.

It is known that the most complex and expensive part of the production process is the refining of bio-oil, so there is a demand from operators to determine the regularity between the chosen type of waste and the pollutants from its pyrolysis process, as well as research to improve and increase bio-oil quality the amount of yield.

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JAUNU KRĀSVIELU SPEKTROSKOPISKĀ UN EKOTOKSISKĀ IZPĒTE

Zinātnē un sadzīvē mūsdienās ļoti plaši pielieti krāsvielas, liela uzmanība tiek veltīta luminiscējošām krāsvielām. Notiek jaunu un spilgtāku krāsvielu meklējumi. Iegūto krāsvielu izmantošana ir atkarīga no to ķīmiskām un fizikālām īpašībām, ļoti svarīgi ir izvērtēt toksiskumu jaunizstrādātām krāsvielām. Dotais pētījums ir veltīts jaunsintezētu fosfororganisku luminoforu optisko īpašību un ekotoksiskuma novērtēšanai. Optisko īpašību raksturošanai diviem organoluminoforiem ar atšķirīgiem aizvietotājiem bija uzņemti un analizēti absorbcijas un luminiscences spektri vairākos organiskos šķīdinātājos ar dažādām polaritātēm. Pētītiem luminoforiem ir raksturīgs izteikts fluorescences solvatohromisms. Ekotoksiskums tika novērtēts, izmantojot graudaugus kā testa organismus. Tika pētīta krāsvielu iedarbība uz augiem to augšanas laikā. Augi tika kultivēti klimata kamerās, varējot krāsvielas un pievienoto krāsvielu šķīdumu koncentrācijas, tālāk veikta krāsvielu iedarbībai pakļauto augu morfofizioloģisku rādītāju (dīgstu garums, svars, šūnu membrānu stabilitāte u. c.) noteikšana un analīze.

Eksperimentu rezultāti rāda, ka ekotoksiskums ir stingri atkarīgs no aizvietotāju dabas luminoforu molekulās: krāsviela ar tiofēna atlikumu ir toksiskākā nekā krāsviela, kas satur fenilgrupu. Iegūtie rezultāti par augu morfofizioloģisko parametru izmaiņām atkarībā no izmantotām krāsvielām un koncentrācijām sniedz svarīgu informāciju par krāsvielu bioloģiskām īpašībām, kā arī novērtē to pielietošanas iespējas vairākās nozarēs.

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METHODS OF SYNTHESIS OF PYRROLO[3,4-C]PYRIDINE AND ANTHRANILIC ACID DERIVATIVES

Key words: niacin, 2,3-dihydro-1h-pyrrolo[3,4-c]-pyridine, anthranilic acid

Nicotinic acid, or niacin, was first presented as a regulator of the balance between low- and high-density lipoproteins, and its mechanism of action has only recently been revealed through cloning of the G-protein receptor (GRP109B). Nicotinic acid and anthranilic acid derivatives have significant niacin receptor agonist properties. To date, many patented compounds have been synthesized that have shown biological activity.

The aim of our work has been to find synthetic routes for the preparation of niacin receptor agonist bioisosteres based on pyrrolo [3,4-c] pyridine I and II and anthranilic acid III derivatives. In the course of the work it was necessary to find as many variations of basic substances as possible as material for further biological research.

Results and its discussion. The range of target compounds was divided into three groups: 1,3-dioxo-pyrrolo [3,4-c] pyridine, 1-oxo, 3-hydroxy-pyrrolo [3,4-c] pyridine derivatives, and the amination and amidation reactions of anthranilic acid adamantane in 2nd position.

Conclusion. 2-Substituted 1,3-dioxo-pyrrolo[3,4-c]pyridines have been formed in the reaction of 3,4-pyridinedicarboxylic acid with amines. The formation of the reaction products is limited by thermal stability of the used amine. Methyl 3-(chlorocarbonyl)-isonicotinate is more suitable raw material for the synthesis of 2-substituted 1,3-dioxo-pyrrolo[3,4-c]pyridines in the case of unstable amines.

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SEARCH FOR NOVEL LUMINESCENT COMPOUNDS

The process where molecules or atoms absorb light at a particular wavelength and to subsequently emit light of longer wavelength, called fluorescence. Modern technology uses this process more often. Fluorescent dyes are now widely used in biomedical and biological investigations. For instance, fluorescence in situ hybridization (FISH), flow cytometry analysis, fluorescence microscopy, confocal laser scanning microscopy (CLSM), polymerase chain reaction (PCR) are important methods in molecular biology and cell biology. These methods use fluorescent dyes. Novel scientific investigations helps to find solutions for new fluorophores syntheses. Overview of scientific journals on syntheses opens the mind to understanding planning strategies. Benzanthrone derivatives attract particular interest due to their excellent optoelectronic and luminescent properties.

The main purpose of present research is the selection of effective synthesis for novel heterocyclic derivatives of benzanthrone with expected useful properties. The second purpose of research to study spectral properties of newly obtained compounds. Fluorescence spectroscopy, UV-vis absorption (UV/Vis) and IR analysis were used to characterize synthesized novel benzanthrone derivatives.

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SPECTROSCOPY OF NOVEL N-BENZANTHRONYLAMIDINES AND ITS METAL CHELATES

Amidines are multifunctional nitrogen-containing bifunctional compounds which chemical and photophysical characteristics can be altered by the introduction of various substituents. These derivatives have been employed as valuable ligands in some catalytic processes for various organic chemistry transformations, as well as ligand for highly emitting metal complex for electroluminescent applications.

Our recent investigations have been focused on obtaining novel organic fluorophores such as N-containing benzanthrone derivatives. Previously we have synthesized new orange-red emitting 3-amidinobenzanthrones with various substituents. It was found that the coordination of transition metal ions with prepared dyes causes a quenching of the fluorescence. Chelation enhancement quenching effect is widely used for Cu(II) and other strongly paramagnetic metal ions such as Fe(III), Cr(III), Co(II) sensing.

Today much attention has been paid to the creation of fluorescent chemosensors capable of effectively detecting various substances. Because pollution of the environment by toxic metals is a major problem in the last decades due to their increasing utilization in industry and agriculture, new methods for their simple detection are of great interest.

For this reason, the present work focuses on the spectral characterization of N-benzanthronylamidines and its complexes with transition metal ions. The calculation of limits of detection based on the linear regression method was performed for investigated metal ions. Obtained results testify that investigated dyes are promising candidates for the detection of transition metal ions in environmental monitoring applications. Further investigations can lead to elaboration of new fluorescent method for analysis of studied cations.

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SYNTHESIS OF BENZANTHRONE DYES FOR VISUALIZATION OF BIOLOGICAL OBJECTS

Study of new benzanthrone dyes and their application to biological objects. Benzanthrone dyes are very important for use in bioanalytics and in molecular biology. This study is aimed to developing a method for the synthesis of new prospective benzanthrone dyes with various substituents in the aromatic core. After the synthesis and purification of the prepared dyes, the photophysical properties of these dyes were characterized by spectrophotometer and spectrofluorometer obtaining data for the search of new perspective fluorescent probes for staining of biological tissues.

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SYNTHESIS OF NEW CONJUGATED FLUORESCENT DYES

The fluorescent molecules have been widely applied in various areas. Development of new fluorescent compounds is of continuing interest for many applications in research and industry.

Among a wide variety of fluorescent dyes currently used in research and industry, benzanthrone derivatives attract particular interest due to their favorable spectral properties.

In the present study, new fluorophores based on benzanthrone with an extended conjugation chain were synthesized and characterized. The solvatochromic behavior of obtained compounds with electron donating and accepting group was investigated in nonpolar, polar aprotic and protic solvents experimentally. The photophysical behavior of these dyes in various solvent was attributed to the intramolecular charge transfer of the compound along with specific and nonspecific interaction with organic solvents. Therefore, the developed fluorescent molecules have a potential prospect in extensive application of biochemical detection and analysis.

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THE INFLUENCE OF TEMPERATURE CONDITIONS ON THE YIELD OF BIOGAS AND METHANE, WHICH IS OBTAINED FROM AQUACULTURE WASTE

Biogas is a gaseous energy resource that can be obtained by anaerobic fermentation using biomass. The main component of biogas is methane (CH₄) and carbon dioxide (CO₂), which also includes other gases with certain physical properties. Biogas is a renewable energy resource that does not pollute the environment and the air. Biogas production reduces landfill growth and reduces water and soil pollution. The trend of biogas technologies is improving every time, thus the supply for biogas production is increasing. Capital investment in biogas plants requires relatively low costs. Their use reduces the greenhouse effect, as decomposing products emit CH₄ and CO₂ gases, which trap infrared radiation reflected from the earth's surface.

The research summarizes information on biochemical processes of biogas production and the parameters that affect the results of its production. The research examines the result of obtaining biogas from bog sludge and a mixture of crushed reed. Particular attention is given to temperature, as a parameter that affects the results of methane and biogas production.

In order to perform the work and obtain biogas, bog sludge from Viļaka region, and bog reeds from Daugavpils Esplanāde park were used in, which were dried and divided into components: stems,

leaves, flowers. In order for anaerobic fermentation processes to be possible, digestate from the biogas plant "Skaista", Daugava region, Skrudalienas parish was used.

The biogas yield during the bioprocess depends on the effect of temperature, the best results in our study were obtained at a temperature of 40°C. During the experiment, 2.78 L of biogas with an average methane content of 38.7% was obtained from a mixture of bog sludge and crushed reeds.

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THE SYNTHESIS OF NEW FLUORESCENT DISUBSTITUTED BENZANTHRONE DYES FOR APPLICATION IN MOLECULAR AND CELL BIOLOGY

Design of new fluorescent disubstituted benzanthrone dyes for application in molecular and cell biology.

Cell and molecular biology are very rapidly developing by both traditional (EtBr, ELISA, DAPI) and modern (MitoRed, SYBrGold) fluorescent assay methods. The importance is the detection of fluorescent dyes, which is specific for the staining of cellular structures and for the visualization of nucleic acids, proteins and quantitative determination of its. Previous studies have shown great promise for using benzanthrone derivatives as fluorescent dyes as to analyze intracellular structures and molecules.

The present research is aimed to the synthesis of new fluorescent disubstituted benzanthrone dyes, as well as the study of their photophysical and chemical properties, the study their future application in molecular and cell biology. 24 fish DNA samples and 12 wheat DNA samples were extracted by salt-out method and were examined for contamination (the ratio of absorbance at A260/280nm and A230/260nm was used to assess the purity of DNA from protein, EDTA, carbohydrates, phenol or other contaminants and DNA concentration by spectrophotometric analysis and DNA fragmentation by gel-electrophoresis.

The next stage of this study will be the synthesis of new disubstituted benzanthrones as potential DNA intercalators and cell fluorescent dyes and with further analysis of their photophysical and chemical properties and as well as their use for DNA analysis and staining of intracellular structures.

DOKTORANTU SEKCIJA „LITERATŪRZINĀTNE”

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DOCTORAL STUDENT SECTION “LITERARY STUDIES”

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CEĻJUMA APRAKSTA ŽANRA BINĀRO OPOZĪCIJU IZPAUSMES MŪSDIENU LATVIEŠU UN AMERIKĀŅU CEĻJUMU NARATĪVOS

Ar bināras opozīcijas terminu parasti apzīmē divu principu, parādību vai lietu pretnostatījumu. Tā ir viena no ceļojuma apraksta žanra specifiskajām iezīmēm, kas ir ļoti būtiskā mūsdienu ceļojumu tekstu interpretācijas procesā. Tādi tematiskie pretstatījumi, kā *savējais-svešais*, *daba-civilizācija*, *mājas-ceļš*, *pilsētvide-lauku vide* u.c. nereti veido ceļojuma teksta kodolu, tādējādi aktualizējot galvenās ceļojuma naratīva idejas.

Salīdzināmās literatūrzinātnes kontekstā binārā opozīcija *savējais-svešais* balstās uz imagoloģijas teorijas. Tā ir zinātniskā disciplīna par „*citū*” un „*svešo*” tēlu radīšanas, funkcionēšanas un interpretācijas likumiem lasītāju receptijā. Imagoloģijas pētījumu galvenais priekšmets ir dažādu kultūru (valstu, tautu) pārstāvju „*svešā*” receptija. *Savējā-svešā* opozīcijas izpausme arī demonstrē divu būtisku imagoloģijas jēdzienu pretstatījumu: *auto-image* un *hetero-image*, no kuriem pirmais veido attieksmi pret rakstnieka dzimto kultūru, savukārt, otrais akcentē citu kultūru. „*Svešzemnieka*” tēls ir pētīts imagoloģijā, kā nacionālās identitātes stereotips, kas nozīmē stabilu, emocionāli un ekspresīvi bagātu šī tēla attēlojumu, kas ir izveidots konkrētajā sociālajā un vēsturiskajā vidē.

Šī pētījuma kontekstā binārās opozīcijas koncepts tiks aktualizēts 20.-21. gadsimtu mijas latviešu un amerikāņu ceļojumu tekstu interpretācijā un sastatāmajā analizē, kurā, pirmkārt, tiks noteiktas fundamentālās binārās opozīcijas mūsdienu latviešu un amerikāņu ceļojumu naratīvos, kā arī tiks atklāts, kādā veidā šādi pretstatījumi izpaužas abās kultūrtelpās. Turklāt, spilgtākās ceļojumu literatūras binārās opozīcijas tiks ilustrētas ar latviešu un amerikāņu ceļojumu tekstu piemēriem to autoru reprezentācijā. Sastatāmās analizēs tiks aktualizēti amerikāņu rakstnieces K. Salakas daiļliteratūras trevelogs „*Baltā sievietē*” (“*The White Mary*”, 2008), I. Ābeles ceļojuma dienasgrāmata „*Austrumos no saules un ziemeļos no zemes*” (nodaļa *K-esmu*) un A. Manfeldes dokumentālās prozas teksts „*Ceļojums uz mēnesi*”.

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ECO-FEMINIST PERSPECTIVE ON WOMEN AND NATURE IN ALICE MUNRO'S “LIVES OF GIRLS AND WOMEN”

In this research the author investigates the relationship between women and nature in Munro's short story collection “*Lives of Girls and Women*” from an eco-feminist perspective. Many of her short stories echo the ecofeminist essence. She has depicted the destruction and degradation of the natural environment by capitalist patriarchy. Men are often shown as the oppressors of women and nature. Alice Munro's concern for the socially oppressed women, nature, and marginalized communities makes her writings suitable for the examination through an ecofeminist reading. The female protagonists are struggling against the stifling patriarchal social conventions. Munro depicts professional women like writers, nurses and journalists fighting the social prejudices to prove their significance and value in the local society. Their talents and professional competence are

underestimated and become a source of continuous harassment they face from a male dominated society. These issues are often interchangeable with ecological issues.

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ОБРАЗ РЕКЛАМЩИКА В РОМАНЕ GENERATION «П» ВИКТОРА ПЕЛЕВИНА

В центре художественного мира романа Generation «П» Виктора Пелевина находится концепция рекламы и рекламных текстов, и их влияние на сознание людей поколения, чья юность приходится на распад Советского союза. Изначально главный герой, Вавилен Татарский мыслит свое будущее как литературную деятельность, но когда советский союз перестает быть закрытым, в мир советского человека стремительно врывается реклама, что заставляет и главного героя поменять свою деятельность. Его жизнь начинает крутиться вокруг рекламы, и её влияние на него очевидно. Он часто меняет место работы в разных рекламных агентствах и в силу разных обстоятельств, и потому что ищет себя как рекламщика.

Одним из важных аспектов является то, что профессия рекламщика или копирайтера совершенно незнакома главному герою, и он начинает обучаться ей с нуля. Учёба в университете дала Татарскому литературную основу, но этого недостаточно, чтобы стать хорошим копирайтером, поэтому он постоянно подчёркивает для себя что-то новое, то, чего он не знал о профессии рекламщика. Каждый новый партнёр и начальник помогает Татарскому раскрыть и сформировать определённый образ «Вавилена Татарского копирайтера».

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ОППОЗИЦИЯ СВОЙ-ЧУЖОЙ В РОМАНЕ Г. ФАСТА “МОИСЕЙ, ЕГИПЕТСКИЙ ЦАРЕВИЧ”

Оппозиция свой-чужой представлена писателем Г. Фастом во многих его исторических романах. Роман “Моисей, египетский царевич” также не исключение. В реферате будет проанализирована данная оппозиция на примере главного героя Моисея – а именно, как автор показывает Моисея как чужака среди своих. Хотя эта оппозиция встречается и в других романах Г. Фаста, интересно то, что в этом романе она представлена в новом ключе – на примере значимого персонажа для еврейской истории – Моисея.

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СВОЙ ИЛИ ЧУЖОЙ? ОБРАЗ БЕЖЕНЦА В РОМАНЕ АЛЕКСАНДРЫ ПЕТРОВОЙ «АППЕНДИКС»

Сегодня Европа переживает самую крупную гуманитарную катастрофу: по меньшей мере 10 млн жителей Украины были вынуждены покинуть свои дома. Сегодня часть из них устраивается в европейских странах. Роман Александры Петровой посвящен судьбам беженцев (мигрантов), которые по тем или иным причинам вынуждены были покинуть родину и обосноваться в Риме. Кто они в этом новом мире? Свои или чужие? Как живется им в Старой Европе?

EKONOMIKA UN SOCIOLOĢIJA

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ECONOMICS AND SOCIOLOGY

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'PATRIMONIAL MIDDLE CLASS' IN THE COUNTRIES OF THE EUROPEAN-AMERICAN CIVILIZATION AT THE BEGINNING OF THE 21ST CENTURY

The relevance of this study is based on the assumption of the French economist T. Piketty that the so-called 'patrimonial middle class' (that 40% of the population in the middle of the wealth distribution who own between a quarter and a third of national wealth) is being formed within the modern European-American civilization (EAC). T. Piketty calls it the most significant structural transformation of wealth in the long run. The purpose of this study is to empirically test the existence of a stable 'patrimonial middle class' in the countries of the EAC at the beginning of the 21st century. In the case of empirical confirmation of the existence of a stable 'patrimonial middle class', it can be used as a tool for studying social stratification. The object of this study are five countries of the EAC – from West to East: USA, Belgium, Latvia, Ukraine, Russia. To obtain relatively stable results, two time points were observed – 1995 and 2021. The source of empirical information on wealth distribution in the above countries is the World Inequality Database. The results of the study showed that the formation of the 'patrimonial middle class' in the modern EAC occurs in different ways. The most stable this is in Belgium, where in 2021 middle 40% of the country's residents owned 41% of national wealth (in 1995 – 39%), i.e. even more than 1/3. A similar situation is observed in Latvia, where in 26 years wealth of the middle 40% has grown from 32% to 34%. Thus, in Latvia the 'patrimonial middle class' also exists and steadily owns 1/3 of national wealth. In the US and Ukraine, the 'patrimonial middle class' is also quite stable and owns about 1/3 of all property, but over the past 26 years this share has decreased by 5% in the US, and by 4% in Ukraine. As for Russia, middle 40% of the country's residents own 23% of national wealth (in 1995 – 40%). At the same time, in Russia, 10% of the wealthiest residents own 74% (in 1995 – 52%) of national wealth, of which 1% own 48% (in 1995 – 21%) of national wealth. Thus, wealth in Russia tends to be concentrated in the hands of 1% of Russians, who currently own almost half of national wealth (according to T. Piketty, a situation close to revolutionary). In none of the five countries surveyed by the author is there such a strong and growing wealth concentration as in Russia that inhibits the formation of the 'patrimonial middle class' in this country.

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ASSESSMENT OF THE INNOVATION POTENTIAL PROCESS COMPONENT OF THE REGIONS OF LATVIA, LITHUANIA AND BELARUS

The concept of innovation potential is closely linked to the concept of innovation and is often viewed in terms of resources or results, but researchers do not pay enough attention to the link between the transformations of resources into an innovation product. To evaluate the process component of the regions' innovation potential, the author uses self-developed integral indicator, as well as divides the

value series of the innovation potential process component into quintiles to ensure comparison and analysis. The method of the formation of integral indicator consists of several stages: unification of statistical indicators, reducing dimensions, forming the integral indicator from the selected indicators. The author produces unification of statistical data according to the principle of linear scaling, dividing the indicators into stimulants and destimulants. To reduce dimensions for excluding insignificant and duplicating indicators, without compromising the objectivity of the results, there is used the method of summing the biggest dependent variable determination coefficients by the explanatory variable. For the formation of the integral indicator, the author applies the method of summing that entails the following stages: summing of innovation potential determining factor indicators, unification of the acquired innovation potential factor values, summing of the acquired unified values of the acquired innovation potential factors for gaining the integral indicator of the region innovation potential, unification of the acquired innovation potential factor values. The author conducts an expert survey in the regions of Latvia, Lithuania and Belarus, dividing it into four blocks: economic and technological components, socio-psychological and cultural components, organization and management, policy and legal framework. The highest values according to the values of the integral indicator are obtained by the regions of Lithuania, but the highest evaluation is obtained by Minsk. The lowest values are obtained in Minsk district, Latgale region, Brest district. In all countries, the process component of regional innovation potential is uneven.

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GADOS VECĀKI CILVĒKI KĀ RESURSS NODARBINĀTĪBĀ

Mūsdienu ekonomikā būtiska nozīme darba resursu pieejamībā ir demogrāfiskiem un vecumgrupu raksturlielumiem – kvantitātei un kvalitātei. Gados vecāku cilvēku īpatsvara pieaugums kopējā iedzīvotāju struktūrā no vienas puses var samazināt pieejamību darba resursiem, ja tie balstīti tikai uz darbaspējas iedzīvotāju grupu, bet otrs aspekts ir tas, ka šī gados vecāku cilvēku grupa var būt svarīgs darbaspēka papildināšanas avots nodarbinātībā.

Sudraba ekonomikas centrā ir sabiedrības jaunās iespējas ekonomikā, pilnveidojot inovatīvu pakalpojumu un preču klāstu gados vecākiem cilvēkiem, tomēr ne mazāk svarīgs ir arī pašas grupas ekonomiskais devums (vai iespējamais devums) sabiedrībai. Sabiedrības uztvere par gados vecāku cilvēkulomu sabiedrībā mainās, jo mainās sociāli ekonomiskie apstākļi un objektīvie faktori – gados vecāku cilvēku grupas raksturlielumi – skaits, īpatsvars un ienākumu struktūra reģionos u.c., kas var padarīt šo grupu pievilcīgāku ekonomikai.

Turklāt cilvēki nenoveco vienādi un tas nenotiek vienā, noteiktā vecumā. Tas nozīmē, ka indivīda pāreja no brieduma gadiem uz vecumposmu, ko pieņemts saukt par *sudraba vecumu* vai gados vecāku cilvēku posmu – senioru vecumu pēc būtības ir vāji identificējama, jo nesaistās ar tikai vienu, viegli izmērāmu kritēriju.

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IMPACT OF PERSONAL VALUES AT WORK

Key words: *development, competencies, personal values, public administration*

Human personal values affect not only personal life but also professional life. Personal values are created for a small child – family, school, studying, working. The personal value criterion of each person crystallizes the experience of life. Over time, they can change, but there are values that are independent. Therefore, each person is special, and their views, opinions, actions and attitudes to one situation may be different. For example, this also applies to the development of competences aimed at improving professional competence at work in order to improve the quality and efficiency of work.

National regulatory authorities are concerned about improving the competence of employees, high funding and other resources are provided to ensure that the skills, knowledge and skills of specialists in the institution meet today's requirements. The quality, satisfaction and direction of the work of national government employees is important for achieving the objective pursued by the authority and for competent specialists to work in the institution. But with restrictions introduced by the COVID-19 virus, the daily lives of each employee have changed. Thus, by assessing their priorities, interests and desires, by putting aside cases which do not play an important role in their lives, such as the acquisition of new knowledge, skills and skills at work. Improving competence can affect each person's personal values, while at the same time the value is influenced by changing attitudes and vision, the person can focus on learning by getting new, unknown, up-to-date offers and information. By identifying the personal values of employees, it will be easier for the person responsible to work individually with each employee of the institution, by applying the most appropriate method to facilitate the development of professional competence.

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LABOR TAX EVASION IN LATVIA: DESCRIPTIVE EVIDENCE FROM DATA ON TAX AUDITS

Tax evasion is a major policy issue that is especially prevalent in transition and post-transition countries. The practice that is particularly widespread in Eastern Europe are the so called 'envelope wages', i.e., an unreported part of remuneration that is paid in addition to the official wage. In Latvia, the share of unreported wages is estimated to exceed 20% [3]. [1] show that 37% of firms in Latvia underreport wages, but [2] study wage underreporting in domestically- and foreign-owned firms and show that households where the head is an employee of a domestically owned firm underreport about 26% of their earnings.

In this paper, we use Latvian State Revenue Service's data on tax audits and administrative firm-level data on wages and employment to infer the prevalence of labor tax evasion across firms working in different NACE sectors and firms with different characteristics. We show that sectors most prone to tax evasion are accommodation and catering (I), administrative and support service activities (N), transportation and storage (H), construction (F), and agriculture, forestry and fishing (A). We also show that firms officially reporting lower wages are more likely to be engaged in labor tax evasion and this result holds for most major NACE sectors. Our results can be used by fiscal authorities to improve effectiveness of additional monitoring effort. Given that tax audits are costly, a more effective targeting of audits towards firms with a higher risk of tax evasion can improve the audit effectiveness.

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LAGGING BEHIND REGIONS IN THE BALTICS: EMIGRATION AND REMITTANCES ANALYSIS

The regional scope of this research is linked with distinctive economically lagging behind regions: Estonian Narva, Latvian Daugavpils and Lithuanian Visaginas. All three regions for a long time were showing comparatively high unemployment rates, average and minimal salaries in these regions are as well much smaller than in capitals. Another common feature of these Baltic lagging behind regions is its Russian socio-linguistic environment – these regions have high density of Russian speaking minority population.

The objective of the research paper is (i) compare emigration process and its patterns within three Baltic countries and (ii) evaluate the overall impact of emigration in economically lagging behind regions.

The overall impact of emigration on the economies of Baltic countries is evaluated by weighting negative and positive factors. Two quantitative approaches were developed in order to measure emigration's influence on the selected Baltic economies and have more realistic results. Each of these scenarios contains different set of parameters and these combinations describe economic impact of the migration. Underlying formula of the undertaken approaches, with small modifications may be used for examination of similar issues in other regions and countries.

Emigration economic impact is undoubtful, moreover, on economies of lagging behind regions. In this paper it is proved, that negative effects of emigration increases, if the level of life/ salary grows in emigration-source country. Overall economies of Baltic countries receive fewer transfers from abroad, than taxes, which could have been paid by current emigrants. However, situation is different in economically lagging behind regions, where salaries are smaller and remittances have relatively higher value. That is why in some cases regional economies are gaining much more from remittances, than they could have earned from taxes of current emigrants, at least in current socio-economic situation.

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MĀRKETINGA AKTIVITĀŠU PIELIETOJUMS UZŅĒMUMOS: VALMIERAS UZŅĒMUMU PIEREDZE

Konkurence dažādu produktu un pakalpojumu vidū aizvien pieaug, lai veiksmīgi darbotos nozarē un citos ikdienas procesos uzņēmumiem ir jānosaka mārketinga stratēģija, kas pielāgoti tieši viņu vajadzībām un mērķauditorijai. Mērķauditorijas atlase ir mārketinga speciālistu uzdevums un šobrīd arī būtisks, lai identificētu patērētāja profilu, kas var sastāvēt no dažādu paaudžu pārstāvjiem. Publikācijā tiek noskaidrots Valmieras novada (Latvija) uzņēmumu pieredze darbā ar dažādiem marketinga elementiem, noskaidrojot biežāk lietotos mārketinga risinājumus, aktivitātes, un modeļus, tostarp uzzinot uzņēmumu mērķgrupas un to, kā ar tām tiek strādāts, īpašu uzmanību vēršot Z paaudzes jauniešiem, kas dzimuši no 1995. līdz 2010. gadam.

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SOCIĀLI-EKONOMISKO DATU PROGNOZĒŠANA ILGTSPĒJĪGAI ATTĪSTĪBAI REĢIONĀLAJĀ LĪMENĪ: METODOLOĢIJAS BŪTĪBA UN ĪPATNĪBAS

Atslēgvārdi: *ilgtspējīga reģionālā attīstība, iedzīvotāju skaita prognozes, sociāli-ekonomiskie dati, simulācijas modelis*

Eiropas Savienības „Teritoriālās attīstības darba kārtība 2030. gadam” (*The European Union Territorial Agenda 2030*) (EU2020.de, 2020) liek akcentu uz reģionu atšķirībām gan pēc to vajadzībām, gan pēc to attīstības procesiem. Ņemot vērā reģionālās atšķirības, paaugstinās reģionālā līmeņa lēmumu un attīstības stratēģiju nozīmi (piem., Dr Cormac Walsh Research and Consulting 2020). Tas, savukārt, rada nepieciešamību pēc zinātniski pamatotiem datiem par sociāli-ekonomisko procesu iespējamām tendencēm nākotnē, jo zinātnieki norāda, ka reģionālo attīstību ietekmējošo lēmumu kvalitāte un ticamība bieži ir atkarīga no iedzīvotāju skaita izmaiņu prognožu precizitātes (piem., Mielczarek, Zabawa 2021). Iedzīvotāju skaita prognozes ir būtiskas ilgtspējīgas reģionālās attīstības veicināšanai, jo kā secina zinātnieki (piem., Park, Heim LaFrombois 2019), tad nākotnes resursu izmantošana un pakalpojumu nodrošināšana vietējā līmenī būtu jābalsta uz iedzīvotāju skaita prognozēm. Turklāt, ilgtermiņa prognozes nodrošina pamatu, lai risinātu aktuālās sociāli-ekonomiskās problēmas, tādējādi novēršot cilvēkkapitāla samazināšanos un ekonomikas lejupslīdi reģionos. Prognozēšana ir instruments, ar kura palīdzību ir iespējams saprast iedzīvotāju skaita izmaiņas pie dažādiem attīstības scenārijiem. Iedzīvotāju prognozēšana notiek gan demogrāfiskajā, gan ekonomiskajā un reģionālajā aspektos (piem., Dykas et al. 2018; Bolinska et al, 2019; Sleszynski et al. 2020). Tomēr, iedzīvotāju skaita prognozes, galvenokārt, notiek valstu, nevis reģionu līmenī. Šajā pētījumā tiek apskatīts simulācijas modelis, kas ir balstīts uz sistēmdinamikas metodēm (*simulation model based on system dynamics methods* (piem., Richardson 1991, 1996)), ar kura palīdzību tiek prognozētas izmaiņas iedzīvotāju skaitā. Pētījuma mērķis ir uzsvērt metodes pielietojanas lietderību iedzīvotāju skaita prognozēm reģionālajā līmenī, kur ir būtiski ņemt vērā reģionālās atšķirības pēc sociāli-ekonomiskiem rādītājiem.

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SYSTEM OF EVALUATION OF PERFORMING RESULTS OF THE MANAGEMENT IN THE PUBLIC PERSONS' COMPANIES

The article “System of evaluation of performing results of the management in the public persons’ companies” is devoted to the issues of organizing the process of evaluating a performance of the board in the public persons’ companies. Despite the fact, that this institute is not an innovation in the corporate governance system of Latvia, a modern economy and finance theory attaches quite limited importance to the use of the board performance evaluation process in the corporate governance area. This process is more regulated with legal norms in the case of public owner’s company. That is if the company is owned by the state with municipality. In the case of a private company the evaluation of performance of the board is attributed to the company’s council of shareholders, who accept the methodology of evaluation. This methodology is based on the privately elaborated principles and is not regulated by the state. Otherwise, in the public persons’ owned companies the regulation of a process of evaluation of the company’s management effectiveness is provided by the legal enactments of government and parliament. The author analyzes the process of evaluation of effectiveness of the board in the state/municipality owned company, focusing on the procedures and financial coefficients used during the process.

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**TO CENSOR OR NOT TO CENSOR:
NARRATIVES OF SECURITIZATION AND INDOCTRINATION
OF PRESS FREEDOM AND INFORMATION ENVIRONMENT
IN LATVIA**

Despite a clear and statutory ban on media censorship, the Belarusian regime's artificial refugee crisis on its border with Latvia, Lithuania and Poland opened a discussion on the seemingly unsatisfactory media work, emphasizing the role of the media in protecting national security and statehood. The influx of refugees to Belarus' borders with European countries in the second half of 2021 not only brought the new refugee crisis and its impact on national security to the media and political agenda, but also created a wave of criticism of the media, especially public media, where politicians actively impeached the editorial choices of media. By publicly criticizing publications and stories related to the refugee crisis on the Belarusian border, politicians from some of the ruling parties tried to securitize Latvia's information environment by making clear calls to censor the media. At the same time, political actors promoted distrust of the media, thus contributing to the indoctrination process, which is not only contrary to the politicians' own norms on strengthening the media and information environment, but is also dangerous in the light of disinformation campaigns, that have proved their efficiency.

The study analyzes the public communication of Latvian political actors on the microblogging site "Twitter" in November 2021, when refugees' attempts to cross the Belarusian-Polish border illegally intensified. The aim of the research is to explain how politicians tried to carry out the process of securitization of Latvia's information environment, as well as to promote the indoctrination of local media. The theoretical basis of the research is based on the theoretical findings of political communication and securitization.

IZGLĪTĪBAS ZINĀTNES

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EDUCATIONAL SCIENCES

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A CHILD-CENTERED APPROACH TO PREPARING CHILDREN FOR SCHOOL: CHALLENGES, ISSUES AND SOLUTIONS

The challenge of the approach is to achieve an organization of the daily learning process that is child-centered and based on the inclusion of learners in the life cycle through activities, workshops and a wide range of child activities. The principle of organizing the learning process is education without borders: we introduce the national traditions of different cultures, learn new skills and develop life competencies. An innovative event-driven approach to the educational event allows the learning process to be organized in a child-centered way, where children learn, explore, test and are ready to apply new skills and competencies in their lives, which children learn in an accessible way. In order to make the learning process motivating, supportive and developing, the thematic planning includes topics of world importance, which children learn in an accessible way and in practice.

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DETERMINATION OF THE EFFECTIVENESS OF THE TEACHER'S ACTIVITY AS A LEADER AND IN TERMS OF THE FORMATION AND DEVELOPMENT OF EDUCATIONAL MOTIVATION AMONG SECONDARY SCHOOL STUDENTS

Key words: educational motivation, effectiveness of the teacher's activity, leadership style, personnel management style

Research objectives: to explore the effectiveness of the teacher's activities as a leader; to explore the educational motivation of secondary school students and the influence of the teacher's activities on educational motivation of secondary school students.

Materials and methods. Qualitative research methods were used in the research – interviews and content analysis of the results.

Outcomes. As a result of interviewing secondary school students in 2021/2022 school year was determined the teacher's leadership style. As a result of interviewing the teacher in 2021/2022 school year was determined the teacher's style of personnel management. Both results were compared and the effectiveness of teacher's activities was determined. As a result of interviewing secondary school students in 2021/2022 school year was explored the educational motivation of secondary school students and the influence of the teacher's activities on secondary school student's educational motivation.

Conclusions. The effectiveness of the activity of a secondary school teacher as a leader directly depends on the style of his leadership and the ability of the teacher to form and develop educational motivation among secondary school students.

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DEVELOPING THE MODELS AND PEDAGOGICAL PRINCIPLES FOR DIGITAL ASSESSMENT

Key words: *models, assessment, feedback, assessment data, digital assessment, assignment*

In the educational process, both learning and assessment involve the use of a variety of technologies. The learning environment has become digital, which raises the question of whether the learning and assessment process is always pedagogically adequate. Technology here is not a value in itself, it is only a tool to achieve pedagogical goals.

The development of the models and pedagogical principles was based on two types of research activities: study of the literature on digital assessment and structured interviews with experienced educators (n = 12) about innovative practice. Thus, a substantial foundation was developed for the creation of pedagogical principles and sketches of static models. The models still under development include the key aspects of the digital assessment process, counting technology, assessment data and feedback. Two of them are intended for a learning unit (e.g. topic, study course, further education course), but one is for a separate assessment case (assignment). It is now important to define precisely the activities to be covered and their direction in order to reflect digital assessment as a pedagogical process, not just a technology-based process.

This research has been supported by a grant from the European Regional Development Fund project "Models of Assessment in the Digital Learning Environment (MADLE)" within the Activity 1.1.1.2 "Post-doctoral Research Aid".

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FORMAL AND NON-FORMAL MUSICAL EDUCATION IN LATVIA: THE SEARCH FOR WELL-BEING

Key words: *music education, formal music education, non-formal music education, well-being*

The huge number of studies shows the positive effects of music on human development. The aim of this theoretical paper is to describe formal and non-formal musical education in Latvia in the context of the promotion of social, emotional, and spiritual well-being. In Latvia, preschool children already often attend musical classes. Many brain centers or interacting processes are involved in learning to play, sing, or make rhythm, thus promoting the positive development and well-being of the child. To date, formal music education in Latvia is widely developed: There are more than 100 music schools for children aged 6-7, more than 10 music high schools that provide secondary professional music education, and there are 3 higher education institutions. Thanks to formal music education, new quality music teachers, musicians, and choir conductors are being trained. Non-formal music education in Latvia is closely connected with the preservation of Song Festival traditions, thus maintaining the identity of Latvia. This Festival establishes a constant need for quality education for young musicians and choir conductors. Many amateur groups – choirs, ensembles, orchestras, folklore groups, dance groups, etc. – regularly participate in the preparation for this huge event. The members of the bands are of different professions and not everyone has a musical education, but they are all united by the desire to make music together. This raises several questions: What internal and external factors motivate people to participate in non-formal musical education (choirs, vocal and instrumental ensembles, folklore groups, orchestras, etc.)? Why is nonformal music education important to people? What do people get to play or sing together? Not only young people, but also adults and seniors actively participate in Latvian music bands. As analysis of the literature and professional experience suggest, making music together clearly promotes the emotional, social, and spiritual well-being of people. Taking into account the large number of persons involved in one or another kind of music making in Latvia, it can be concluded that there is a demand for nonformal music education among

young people, adults, and seniors. Finally, we can conclude that both formal and nonformal music education is a way for people to promote their social, emotional, and spiritual well-being.

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OBSERVATION OF 3 YEARS CHANGES IN THE CHEMISTRY E-LEARNING PROCESS CONCENTRATED ON SOLVING CALCULATION AND EXPERIMENTAL TASKS DURING THE PERIODS OF FORCED DISTANCE LEARNING

Key words: distance learning, Uzdevumi.lv, chemistry education, experimental tasks

Distance learning process became an ordinary process during the last 2 years of COVID-19 pandemic. Many educational institutions have switched to distance learning and usage of e-learning platforms significantly increased by users' amount and time spent by one user. The purpose of the article is to present analysis results of changes in students behaviour on the platform Uzdevumi.lv mainly concentrated on solving calculation and experimental tasks skills during the last 3 years.

Materials and methods. The site with materials on the basis of Uzdevumi.lv platform is used.

Results and its discussion. There is an analysis of e-platform based on the Uzdevumi.lv platform used in Latvia that have been in demand during continuous distance learning obstacles in 2020 and 2021 compared with the year 2019. On the example of teaching chemistry in a basic school in Latvia the peculiarities of changing the teaching load of students are revealed. It is shown that the mass transition of students to e-learning in a short time does not lead to a deterioration in the formal indicators of their level of training.

Conclusion. There is a stable and continuous usage of distance learning platforms. Students have adapted and perceive learning through the platform as a daily process, even on solving calculation and experimental tasks in chemistry.

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POSSIBILITIES FOR DEVELOPING CREATIVE THINKING IN VISUAL ARTS LESSONS IN 4. CLASS

In our days a wide variety of technologies and digital platforms are evolving rapidly. Children use mobile phones, laptops in their daily lives, playing computer games without developing their creative thinking and potential, because in the digital age, everything seems to be invented and ready.

Starting from 2020/2021. the Ministry of Education of the Republic of Latvia started implementing the new education standard, there the subject of visual arts according to the new education system is in the field of cultural understanding and self-expression in the field of study. knowledge and skills are acquired in one subject, and when it comes to human self-expression, it must be borne in mind that self-expression is closely linked to creativity and creative thinking.

In their practice, visual arts teachers often face the problem of students' lack of ability and creative potential, which makes it very difficult for both the teacher and the student to work.

The new educational standard envisages the integration of transversal skills in school subjects, where thinking and creativity is one of the four transversal skills that students need to acquire in the learning process, thus making the topic of this study relevant due to the introduction of new education.

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POSSIBILITIES FOR THE DEVELOPMENT OF CRITICAL THINKING IN VISUAL ARTS LESSONS IN PRIMARY SCHOOL

Key words: *critical thinking, critical thinking skills, critical thinking methods and techniques, critical thinking as a cross-cutting skill, visual arts, primary school children*

The topic of the master's thesis "Possibilities for the development of critical thinking in visual arts lessons in primary school" has been chosen with the aim to explore and find out the possibilities for the development of critical thinking and to develop an appropriate set of tasks in visual arts for the 1st grade.

In Latvia, the concept of critical thinking is considered in two ways, there are teachers who support the use of the critical thinking approach in education, and there are those who are quite sceptical about it.

The topicality of the research is determined by the implementation of the new content, which is based on cross-cutting competencies, including critical thinking as one of the competencies. The theoretical part of the master's thesis analyses and summarizes information about the concept of critical thinking, its content, the history and development of critical thinking in Latvian education, as well as the understanding of critical thinking in the context of competencies.

Normative acts, samples of study programmes, methodological and other materials have been studied. In the empirical part, a pedagogical experiment in visual arts was conducted in the 1st grade according to the principles of developing critical thinking.

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PRE-SCHOOL EDUCATION TEACHERS MOTIVATION TO IMPROVE SELF-DIRECTED PROFESSIONAL COMPETENCE

Key words: *pre-school educational institution, preschool teacher, self-directed work, motivation, professional competence*

The aim of the research: To study the professional competence of preschool teachers and develop recommendations for ensuring self-directed professional competence development.

Research methods: The research includes collecting data through surveys based on the professional standard of the teacher, analysis and interpretation of the obtained data, clarification of the most important factors and drawing conclusions.

Results: In order to study the self-directed professional competence of a pre-school teacher, the state pre-school educational institutions of city "X" were interviewed, where pre-school teachers of "n = 53" were interviewed, as well as the deputy heads of state pre-school educational institutions of city "X" were interviewed.

After the process of collecting, analyzing and evaluating the data, the necessary directions for supporting the increase in the self-directed professional competence of preschool teachers are clarified.

Based on the obtained research data, recommendations have been developed to ensure the development of self-directed competence of pre-school teachers.

Conclusions: The developed recommendations will help to motivate the quality of self-directed professional competence of pre-school teachers, respectively, also the level of pre-school children's education.

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PUBLIC EDUCATION ABOUT COVID-19 AND DISINFORMATION: ANALYSIS OF LATVIAN MEMES ON FACEBOOK

Key words: *memes, disinformation, social media, humour, Covid-19*

The aim of the article is to analyze the content of memes, which reflects to the coronavirus pandemic and disinformation or misinformation that the Latvian users faces on the social networking site Facebook, and find out what kind of approaches and narratives are used to inform and educate users about Covid-19 situation in Latvia.

The main object of research is memes created by social activists who are interested to fight against disinformation and educate people by information and humour. Humor in memes creates intertextual references based on the culture and social-political situation in Latvia.

The results of the study show that communication by memes uses a diverse approach, less often using information as data, but more often the comparative approach of humor and arguments from opponents of vaccination, which contrasts with what the scientists say. Evaluating meme as a form of attractive type of education, the use of memes has its drawbacks and problems as it creates a simplified view of the situations and ridicule the opposite opinions, but the format of memes does not allow the use of a broad base of arguments.

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TEACHING PRACTICUM IN THE COVID ERA: REFLECTIONS FROM PRE-SERVICE TEACHERS

Key words: *Covid-19, teaching practicum, teacher education, pre-service teachers*

In Jamaica, like other territories, the Covid-19 pandemic led to an emergency reaction to teaching and learning in a virtual space with the expectation that, *inter alia*, pre-service teachers will undertake the practicum exercise in a manner in which they have not been prepared. Among many other things, the unexpected Covid-19 pandemic has jolted the education system and has challenged our strongly held conceptualisations, beliefs and practices of teacher education and training.

Teaching practicum, according to Clark (2021), is the avenue through which pre-service teachers initialise their development as practitioners. Hence, a critical aspect of this development is classroom management. Classroom management encompasses social and emotional development, character development, academic gains and collaboration (LePage, et al., 2005).

Research question: But what are the experiences of pre-service teachers who engaged in a twelve-week teaching practicum that was conducted virtually? With this core question in mind, **the aim** of this qualitative inquiry was to understand the experiences and to share the reflections of three pre-service teachers who were compelled to undertake, in a virtual space, their twelve-week teaching practicum as the capstone component of their four-year course of study.

Methodology of the study: To appreciate the reflections of the participants, data were collected through semi-structured interviews and lesson plan reflections written by the participants and the findings are presented using a thematic approach, illuminating the pros and cons of conducting teaching practicum in a virtual space.

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THE MAIN ELEMENTS OF THE EDUCATION SYSTEM IN THE STUDY COURSE FOREIGN LANGUAGE

Key words: *system purpose, system impact, system elements, adult education*

Using the professional experience, the author would explore and evaluate the elements of the adult education system. However, in the article, the author would not limit herself to the list of system elements, but would also indicate the circumstances that directly or indirectly affect each of the system elements, thus leaving an impact on the overall functionality of the system. As we know, a system is a set of certain methods or elements that ensure the achievement of certain goals as a result of interaction. Thus, it can be concluded that the elements of the adult education system in the study course Foreign Language could be identified only after defining the basic goal. When determining the goal required for the system, the answer to the following basic question should be clarified (which can be supplemented with a number of additional questions for the accuracy of the goal):

Why does an SFRS employee need English language skills?

It should be noted that a precise definition of the objective would be possible only if the answer to the above question is detailed and based on the actual situation, including the vision and objectives set by the SFRS as an institution. About some of the most important elements of the system, which would be evaluated in the article.

System element – time resource. The defined goal (level of English language competence) should be objectively achievable within the specified time frame.

System element – zero point. The author determines the need to identify the level of English language competencies when starting the study program.

System element – motivator. It should be noted that the lack of motivation is one of the most significant problems that negatively affect the achievement of the set goals.

The author used such research methods as analysis, synthesis and comparison.

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YOUTH POLICY IMPLEMENTATION IN DAUGAVPILS CITY MUNICIPALITY

Key words: *youth policy, working with youth in a municipality, transversal skills*

When thinking about people living in a particular area, it is a special task for everyone to create an environment in which she/he would feel accepted, understood, and supported. In the EU, 2022 is set to be the European Year of Youth, where young people have a particular role in creating a greener, more inclusive, and more digital local and global environment. The European Year of Youth specifically focuses on the opportunities for young people to learn and engage in different activities. Such activities as green lifestyle, digitalization, health, well-being and sport, culture and European mobility, employment, policy dialogues, and participation invite young people to be active.

In identifying the needs of young people and planning youth work policy in the municipality, a survey was conducted on youth communication, satisfaction, and opportunities in Daugavpils city municipality where 434 young people participated in the survey. The gained data were analyzed according to the methodology of mixed study data analysis.

The research data reveals the main problems related to young people's awareness of local government work, lack of activities, and draws attention to the participation opportunities in Daugavpils city municipality.

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ASSESSMENT OF ANTHROPOGENIC IMPACT IN FOUR SPECIALLY PROTECTED NATURE TERRITORIES IN AUGŠDAUGAVA MUNICIPALITY

Key words: nature reserves, Augšdaugava municipality, anthropogenic impact

In the Republic of Latvia, specially protected nature territories (SPNT) are classified as geographically defined areas that are under special state-level protection, in order to protect and preserve diversity of the nature (natural habits of protected species, rare and typical nature ecosystems, Latvian landscapes etc.).

The research was made in four nature reserves located in Augšdaugava municipality: Tīrās sūnas purvs, Raudas meži, Pašulienes mežs and Ļubasts. Nature reserves are nature territories unaffected or slightly affected by human activity that include habitats of specially protected wildlife species of plants and animals and specially protected biotopes. The main natural values in the study areas are forest, freshwater and bog biotopes and various protected species of European Union importance.

Not all economic activities are prohibited in areas mentioned above, for example in these areas can be done logging works, except for the period from 15 March to 31 July, when it's prohibited. Berry, mushroom picking, and agricultural activities are also allowed.

In order to evaluate the anthropogenic effect on research areas, their overall condition and anthropogenic impact (number of unauthorized dumping sites and fire sites, vegetation trampling, etc.) have been assessed.

The obtained results can be used in developing individual protection and use regulations for the above-mentioned nature reserves.

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AVIFAUNA DIVERSITY IN ALIWAGWAG PROTECTED LANDSCAPE: A SUPPORT TO ENHANCE PROTECTED AREA MANAGEMENT

The essential and basic step in determining conservation measures in protected areas is the fundamental knowledge of the richness of biodiversity. Considering the lack of studies in Aliwagwag Protected Landscape for effective management measures, this study sought to provide detailed data on the avifauna and the thriving threats in the said protected area to help the Protected Area Management Board in scaling up their management interventions. The 2-km transect walk and opportunistic methods were employed in three different vegetations inside the protected area. Key informant interviews were also conducted to obtain supplemental information about the activities inside the area.

The results revealed a total of 85 avifauna species, 43 of which are endemic in the Philippines, and 13 of them are restricted to Greater Mindanao Biogeographic Zone. Four of the recorded species are considered Critically Endangered under the DENR Administrative Order 2019-09, namely, the Philippine Eagle (*Pithecophaga jefferyi*), Amethyst Brown Dove (*Phapitreron amethystinus*), Philippine Hanging Parrot/ Colasisi (*Loriculus philippensis*), and Philippine Leafbird (*Chloropsis flavipennis*).

The different vegetation of the Aliwagwag Protected Landscape supports abundant and rich endemic and threatened species that are priority for conservation and require heightened protection measures to promote bird population and richness. However, anthropogenic disturbances particularly unsustainable resources utilization for livelihood were observed inside the protected area which affects avifauna composition. Hence, balancing the protection and conservation of biodiversity while promoting biodiversity-friendly livelihood to resource-dependent communities are the most ideal management interventions the protected area management can provide for sustainable development.

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BIRCH POLLEN IN LATVIA 2003–2020

Raising the number of allergenic people is observed worldwide and according to European Academy and Clinical Immunology, there will be about 50% allergic Europeans by the year 2050. Birch pollen being the main spring allergen in Latvia, is positioning high risk of respiratory diseases. Since the very beginning of aerobiological monitoring in Latvia main attention was put exactly on birch pollen research. Thus, birch pollen concentration annual, seasonal and daily changes, as well as seasonal pollen integral and flowering start and end dates were studied in detail.

Well seen changes were observed in phenological phases of birch. The start of the pollen season becomes earlier and it is explained by the temperature of the air. Birch needs an exact amount of heat to start flowering and heat accumulates from positive temperatures of air. Next, seasonal pollen integral (SPIn) – in other words, the amount of pollen coming from birch catkins every year, is subject to change. First, the common growing tendency of SPIn was observed, the second, birch has bi-annual cycle of productivity.

The percentage of birch pollen allergy sufferers in Latvia is still unknown as a result of the absence of joint medical statistics in the field of allergy. Recently created application Pasyfo allows to evaluate the level of public interest in pollen allergy topics.

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COMPARISON OF PLANT BIODIVERSITY AND ABIOTIC FACTORS IN SEMI-NATURAL GRASSLANDS WITH DIFFERENT MANAGEMENT PRACTICES: HORSE-GRAZED PASTURES VS HAY MEADOWS AT RIEBIŅI DISTRICT

Relatively little scientific information is obtained in Latvia until now on the vegetation structure and botanical composition of pastures, where seasonal horse grazing was the predominant type of land management of these grassland habitats. Therefore, in early autumn of 2020 and in summer and early autumn of 2021 the field studies of vascular plant species composition and abiotic factors were carried out in horse-grazed pastures and hay meadows at Riebiņi district. The floristic inventories were conducted following the procedures described by González-Hernández et al. (2020) in a set of six circular plots within horse pastures of the horse farm “Trīs Vītolu staļļi” and six circular plots in the

area adjacent to pastures – within meadows used for hay-making. The presence of vascular plant species was identified in all plots and recorded into survey form. From this floristic inventory, Whittaker species richness S (total number of vascular plant species), Whittaker beta-diversity index, Shannon-Wiener diversity index H' and Simpson's diversity index D were determined by standard methods to assess the biodiversity in horse-grazed pasture and meadows. In order to determine the impact of horse grazing on the botanical composition and biodiversity, the data on the plots in the pastures were compared with the data on the plots in the hay meadows. The soil survey was also performed in all plots, as well as abiotic factors were identified based on the high-resolution digital elevation model, i.e. position in the terrain and slope aspects, which could affect the composition of plant species. The obtained data provided material for botanical interpretations and comparison of plant biodiversity in semi-natural grasslands with two different management practices. The results of the study indicate that the horse-grazed pastures of the horse farm "Trīs Vītolu stallī" can be described as a species-rich semi-natural grassland habitat.

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DABAS LIEGUMĀ „LUBĀNA MITRĀJS” ESOŠO TŪRISMA RESURSU/OBJEKTU IZVĒRTĒJUMS

Atslēgvārdi: tūrisms, ĪADT, tūrisma objekti, Lubāna mitrājs

Dabas liegums „Lubāna mitrājs” ir lielākais iekšzemes mitrāju komplekss Latvijā, kas izveidots 2009. gadā, ar kopējo platību 51'351 ha. 2016. gadā tika īstenota sadarbība starp četrām pašvaldībām, kuru teritorijā atrodas lielākā daļa no dabas lieguma. Sadarbība tika aizsākta ar mērķi kopīgi īstenot tūrisma aktivitātes, lai veicinātu teritorijas atpazīstamību. Īstenotās aktivitātes ir veicinājušas tūristu plūsmas pieaugumu primāri Lubāna ezera apkārtnē, bet tas ietekmējis arī apmeklētāju skaita palielināšanos visa lieguma teritorijā. Nav veiktas tikpat mērķtiecīgas darbības, lai nodrošinātu tūrisma infrastruktūras kapacitātes palielināšanu. Ir būtiski meklēt risinājumus un analizēt pieejamo informāciju, lai ceļotāju skaita pieplūdums neveicinātu nelabvēlīgu esošās tūrisma infrastruktūras kapacitātes noslogojumu, radot augsta riska antropogēno slodzi uz dabas lieguma bioloģiskās daudzveidības – sugu un biotopu stāvokli.

Apsēkti un izvērtēti esošie tūrisma resursi/objekti – 19 antropogēnie objekti, kā arī 27 dabiskie resursi, kas tiek vai varētu tikt izmantoti tūrisma attīstībai un jaunu piedāvājumu veidošanai. Objekti vērtēti atbilstoši izstrādātajiem kritērijiem. Veikta analīze, lai noskaidrotu katra objekta šī brīža stāvokli, kā arī nākotnes attīstības perspektīvas un citus aspektus.

Antropogēnie tūrisma objekti, kas atrodas lieguma teritorijā, galvenokārt tiek izmantoti šī brīža tūrisma piedāvājumā, ņemot vērā, to atrašanās vietu dabas lieguma teritorijā, ir aizvien augsts attīstības potenciāls un iespējas. Tūrisma objektiem ir nepilnības, kas ir jāuzlabo, kā piemēram, pakalpojumu dažādošana, norāžu trūkums, kā arī objekta apkārtējās vietas uzlabošana un sakārtošana, objektu tehniskais stāvoklis, kas ir būtiski ilgtspējas nodrošināšanā. Dabiskajiem tūrisma resursiem ir liels attīstības potenciāls, tomēr, sabalansējot attīstības iespējas ar dabas vērtībām. Trūkst pieejamas informācijas par objektiem un to apmeklēšanas iespējām, vairāk tiek izceltas galvenās tūrisma pievilcības uz ko balstās esošais tūrisma piedāvājums – Aiviekste, Lubāns, zivju dīķi. Pārējie dabas resursi tiek iekļauti atsevišķās tūrisma aktivitātes, tomēr tās ir vairāk stihiskas.

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DEVELOPMENT OF STREAM NETWORK DATA AND DEM FOR CATCHMENT MODELLING BY SWAT+: A CASE STUDY OF THE RIVER DVIETE WATERSHED

During the past decades, attention has been focused on issues of adaptation to climate changes and associated extreme meteorological events like droughts or heavy rainfalls in order to reduce land and water resources degradation, as well as to mitigate conflicts between water use in agriculture and other human and environmental demands for water. In such a context modelling of the measures, including the retention of nutrients and water and in small agricultural watersheds are important for the management and protection of water resources in Europe. Among others, the soil and water assessment tool SWAT+ model (Arnold *et al.*, 1998) has been widely used for such purposes by the scientific community and practitioners around the world. The SWAT+ model has been applied as an effective tool for modelling nutrient and water transfer, hydrogeomorphological processes, soil erosion by water, as well as for evaluation of global warming and land-use change effects in different geographic regions and environmental conditions. Therefore SWAT+ model was chosen for assessing and modelling factors influencing the quality of water, e.g. modelling of sediment and nutrient transfer from small catchments. As a case study, the River Dviete watershed was selected. Digital elevation model (DEM) and stream network represented as shapefile vector data are very important inputs in SWAT+ model for simulating streamflow. Hence, at the initial phase of modelling, high-resolution DEM was developed from airborne LiDAR data. The DEM development was carried out in ArcGIS environment from filtered *.LAS points by IDW interpolation. After that hillshade elevation raster data of the River Dviete watershed was generated, allowing visual identification of linear relief features representing streams and amelioration ditches. Subsequently, streams and ditches were manually digitised as polyline features, simultaneously providing attribute data input and topological connection of stream network elements.

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DIFFERENCES IN BETULA PENDULA, PINUS SYLVESTRIS AND PHLEUM PRATENSE POLLEN CHEMICAL COMPOSITION

Anemophilous plants produce a large amount of pollen to increase plants possibility of pollination and producing seeds. The presence of pollen in the air may affect humans causing respiratory allergies and noticeably reducing the quality of life. Furthermore, the rates of pollen allergy in the European population increase every year. Mentioned tendency might be explained by several reasons: (i) lifestyle; (ii) urbanisation; (iii) changes in urban plant pollen composition; (iv) etc. One of the theories describes pollen from the urban environment as more aggressive in allergies. For the first stage of the study, the analysis of pollen composition from a different location was made.

Thus, for the first stage of the study, chosen territories were: different sites of Saldus city, rural territory "Dzejēni". Three dominant pollen types from various locations - *Pinus sylvestris*, *Betula pendula*, *Phleum pratense* were selected for the study. The chemical composition of pollen grains, including the pollen wall called exine, was achieved using the scanning option of electronic microscope SEM.

Noticeable differences between pollen type compositions were found. In all cases, dominant elements were nitrogen and oxygen because exactly these elements the pollen wall material, sporopollenin, is made from. Moreover, potassium, phosphorus, sulfur, magnesium, silicone, chlorine, and other elements were noticed.

The analysis of pollen wall with SEM gets useful results; however, further research on this topic is required to find the method allowing to analyse separately particles stuck to pollen wall and contamination of pollen grain itself.

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ENERGY RESERVES OF ALIEN GAMMARIDS IN THE DAUGAVA RIVER IN 2020

Ponto-Caspian *Gammarus varsoviensis* and *Pontogammarus robustoides* are dominant gammarids in the Daugava River, but their studies of energy reserves have not been investigated till now in Latvia. The energy reserves (glycogen and lipids) are the main energy storage compounds in metabolism and can characterize beneficial traits of their invasion. The aim of the study was to characterize the seasonal variations in the lipids and glycogen in alien species of gammarids in the Daugava River. Qualitative samples of gammarids were collected in the four sites in the Daugava River (including Pļaviņas Reservoir) once or twice times in the month from April to September 2020 in a depth up to 0.5 m using a hand net with a mouth opening of 25 × 25 cm (500 μm). In parallel with sampling, physico-chemical parameters were measured. The content of energy reserves was analysed in single individuals by using spectrophotometric methods. Results revealed seasonal differences in biochemical composition, as well as differences among sexes and species. The largest proportion of the stored energy is formed by lipids. Mean lipids and glycogen concentrations were higher in females than in males in both species. Compared species, mainly the higher, but not significant, concentrations of lipids and glycogen were observed for *P. robustoides*. These changes evidently coincide with the reproductive period. This research was supported by the DU Research Project No. 14-95/2022/16 "Environmental assessment of the Daugava River by analyzing energy reserves of alien amphipod *Gammarus varsoviensis*".

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FLOOD RISK ASSESSMENT AND MAPPING OF THE DUNAVA PARISH OF JĒKABPILS COUNTY

The risk of flooding is a serious natural hazard that has negative impact on human health, environment, cultural heritage and economic activity as well as on the infrastructure objects and private un public property. Identification of territories affected by flooding is very important in order to protect people and their economic activities. It is important to assess the probability and long-term trends of annual floods to be able to forecast such extreme events in future.

The largest natural river-floodplain system in Latvia is in the Daugavpils-Jersika stretch of the Daugava River. The Dunava parish of Jēkabpils county is located within this area and is regularly inundated by the flood waters of the Daugava River at spring.

The main aim of this study is to map the inundated areas of the Dunava parish at two different flood water levels with a 1% and 10% reoccurrence probability by using various data sources. For this purpose, long-term records of the highest annual flood water levels of the Daugava River at Jersika were obtained from Latvian Environment, Geology and Meteorology Centre. These data were then used to construct a flood duration curve and state the flood water levels with corresponding reoccurrence probabilities. The obtained results were used to map the borders of the inundated areas at both flood water levels by using the newest topographic maps and a digital terrain model. The

maps were verified by comparing them to the highest flood water levels observed in 1931 and 1951 and marked on a historic storage building of the “Daugavieši” farmstead at Dunava village. The obtained maps show that large areas of agricultural lands, several farmsteads, and as well as the road *Jēkabpils-Dignāja-Ilūkste* is inundated at the highest observed flood water level. The results of this study can be used for territorial planning as well as for an assessment of possible damage to critical infrastructure of the Dunava municipality in the case of an extreme flooding.

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GEOGRAPHIC DISTRIBUTION OF AEOLIAN LANDFORMS IN THE AUGŠDAUGAVA SPILLWAY VALLEY REVEALED BY GIS ANALYSIS OF HIGH-RESOLUTION DEM

Indications that inland dunes as minor landforms are presented in the Augšdaugava spillway valley for the first time has been provided by G. Eberhards in 1991 in the functional zoning of Nature Park “Daugavas loki”. However, contrary to other inland dune massifs in Latvia, there is a lack of scientific data on geomorphological characteristics of these aeolian landforms including their geographic distribution, dimensions, planform shape and orientation. Therefore, authors performed studies focused on detection and GIS analysis of aeolian landforms from airborne laser altimetry or LiDAR data. In this research, LiDAR data as *.LAS format point cloud available in the Digital Height Data open data files of the Latvian Geospatial Information Agency was used to generate a high-resolution DEM. To optimize DEM constructing process and reduce the time necessary for computer processing of input data, at the first step *.LAS points were aggregated into *.LAS dataset covering the entire valley. Then *.LAS dataset was filtered with ArcGIS software by classification code “ground”, thus extracting from laser scanning data only points representing the bare earth. After that raster format DEM with spatial resolution 0.4 m was created from filtered data by ArcGIS tool ‘LAS Dataset to Raster’ following the standard procedure of the IDW interpolation. In order to provide visual detection of inland dunes, a hill-shaded relief model was derived from DEM. Considering that interpretation of landform features from a single hill-shaded map could be biased by the direction of illumination, four thematic raster layers were created with sun altitude of 45° and sun azimuths of 45°, 135°, 225° and 315°, and vertical exaggeration factor 5. Finally, in the process of visual interpretation, combining raster layers with variable azimuths, boundaries of dunes were manually digitised as polygon features and geographic distribution of aeolian landforms in the Augšdaugava spillway valley was revealed.

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GIS-BASED ASSESSMENT OF MID-TERM CHANGES IN FOREST VEGETATION COVER IN THE RIVER DVIETE CATCHMENT

Recently, in many EU countries, the processes of natural environment changes are characterized by the reduction and fragmentation of forest areas. At the same time, forest habitats are considered to be one of the most vulnerable types of vegetation, because it takes the longest period for regeneration after the cutting. Hence, the analysis and assessment of changes in forest vegetation cover are of particular importance in terms of nature conservation issues, as well as are relevant for many scientific studies. Besides studies focused on the assessment of spatial and temporal changes in forest vegetation cover are essential for the modelling of water resources use and retention of nutrients in small catchments. Thereby GIS-based analysis and mapping of mid-term changes (four decades) in forest vegetation cover have been performed over one case-study territory – a relatively small

catchment of the river Dviete. Using GIS allows to combine maps of different scales published in the former USSR from 1958 to 1980 and to digitize thematic layers of forest lands. Obtained historical data were combined with the aerial photographs flown 2020 in scale 1:10,000 and digital infrared orthophoto maps with a spatial resolution of 0.25 meters to measure changes in the extent and spatial pattern of forest vegetation cover. Obtained results show that in general contemporary distribution of forest patches comply with ones depicted in topographic maps of the end of the 20th century. The main changes have taken place in the northern part of the river Dviete catchment, where large areas of forest have been cut down by Joint Stock Company "Latvia's State Forests". The increase in forest cover area following the abandonment of agricultural lands is less significant.

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GRANULOMETRIC PROPERTIES OF TERRACE FORMING SEDIMENTS IN THE AUGŠDAUGAVA SPILLWAY VALLEY

The Augšdaugava spillway valley is the largest terraced river valley located in the SE part of Latvia. The terraces in this valley represent fluvial landforms of complex origin, which have been developed in the course of the incision and lateral migration of the river Daugava. Usually, two types of fluvial terraces can be distinguished considering the internal geological structure and sedimentary composition of terraces, i.e. (i) erosional terraces and (ii) aggradational terraces. In order to identify the typology of terraces, the studies on granulometric properties of terrace forming sediments were performed. For these purposes, near-surface augering by AMS Mud Auger system and georeferencing by GPS was used to investigate the lithofacies of clastic sediments in the Augšdaugava spillway valley. In total 98 samples of terrace forming sediments were collected. Analysis of the granulometric properties of medium to fine graded sand sediments ($M_a < 2$ mm) has been performed by a laser diffraction particle size analyzer Malvern Mastersizer 2000, whilst coarser graded gravel and pebble sediments ($M_a > 2$ mm) were analysed by geotechnical sieves and Octagon 2000 digital shaker. Data on the mean grain size M_a and other granulometric indicators were extracted from the results of grain size analysis by applying GRADISTAT module and software R package "mixdist". For graphic representations data of granulometric properties of each sample were plotted as particle size distribution frequency diagrams. The results of the granulometric analyses of terrace forming sediments indicate that terrace T1 is aggradational or fill terrace, consisting of typical alluvial fine sand and silt deposits. Summarizing the results of granulometric analyses for terraces T2 to T8 it is necessary to note, that, unlike terrace T1, other terraces are erosional terraces. The terrace forming sediments in this case are represented by coarse-grained clastic and sand interlayered sediments.

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INFLUENCE OF RELIEF ON SOIL MORPHOLOGY AND TYPES: A CASE STUDY IN ČORNAJAS RURAL MUNICIPALITY, RĒZEKNES DISTRICT

Studies on soil properties and morphology are relevant as it allows for more accurate and detailed mapping of soil on a larger spatial scale, which in turn allows better planning of human agricultural activities, reduction of soil degradation, implementation of erosion prevention measures and conservation of soil resources. Considering that soil properties and types can vary over a short distance along the catena, it is important to identify the relationship between affecting abiotic factors and changes in soil cover. Therefore, in the summer and early autumn of 2020, the field studies were carried out in near farmstead "Straujupītes", Čornajas rural municipality, Rēzeknes district. The aim of the study was to elucidate whether the difference in local elevation and slope gradient affects the

diversity of soil morphology, soil types and subtypes. During the field survey, the soil profile pits with depth up to 2 m were prepared along the transect line, precise location of each pit was recorded by GPS Trimble Juno T41/5. Description of soil vertical profile and identification of soil type at each pit was performed following standard procedures. In total 17 pits were examined at three different profiles, which allowed to construct the complex catena and to prepare a soil map. The obtained results indicate that automorphic soils dominate in the study area, where vegetation cover is presented by mixed forest and broad-leaved forest. Sandy loam and loam are the most common texture classes of soils. However, the correlation between slope gradient and soil properties was not elucidated yet. It highlights the necessity of further studies.

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PHYSICAL AND CHEMICAL CHARACTERISTICS AND ASSESSMENT OF WATER ENVIRONMENTAL QUALITY OF LAKE BAĻOTES

The water quality assessment of lakes, as well as studies of factors affecting the environmental quality of surface waters, is crucial to protect this vital resource and to provide their appropriate management in terms of the Water Framework Directive 2000/60/EC and the development of recreational opportunities. For this reason, Lake Baļotes was chosen as territory for detailed studies of physical and chemical parameters and water quality characteristics. The Lake Baļotes is a public water object that is located in the NE part of the Jēkabpils district and it is used by local people as a swimming place, licensed fishing and other recreational activities also are offered. During the Soviet period, the lake was polluted by wastewater from a poultry farm and diffuse sources of agricultural pollution. Since 90-ties water quality of the lake has gradually improved, yet algae blooming occurs regularly. To obtain the data on the current status of the Lake Baļotes, series of tasks were realized and different methods were applied, from which sampling of water, measurements of water physical and chemical parameters *in situ* and the laboratory, as well as GIS analysis of hydrogeomorphological characteristics were mainly applied. The samples of water were obtained at three sampling points in the lake and from different depths by step 1 m. Simultaneously the measurements of water physical and chemical parameters at the same points and depths were performed by multiprobe YSI DSSPro. The water samples were analysed at the Laboratory of Environmental Chemistry of Daugavpils University, where the assessment of BOD₅ was carried out by dissolved oxygen probe YSI 5000, and concentrations of nutrients (N-NO₃, N-tot, P-PO₄ and P-tot) were determined by flow injection analysis device FIALab 2500. In addition, delineation of catchment and analysis of lake's hydrogeomorphological parameters was performed in GIS environment to elucidate factors affecting the environmental quality.

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TEMPORAL CHANGES IN CONCENTRATIONS OF PARTICULATE MATTER PM 2.5 AND PM10 AS INDICATOR OF ENVIRONMENTAL QUALITY IN THE URBAN AND RURAL ENVIRONMENT

Air pollution by fine particles PM2.5 and PM10 negatively affects human health, life quality and environment, hence it is ranked among important environmental concerns. However, the automated stations in Latvia for measurements of PM concentrations and monitoring of air quality are installed only in seven locations. It should also be noted that there are no monitoring stations of PM pollution in SE Latvia, where the second biggest city Daugavpils is located. Consequently, the concentrations of PM in the air are not measured in this region and there is no data on environmental quality. Considering that, the measurements of particulate matter PM 2.5 and PM10 concentration and its temporal changes were performed to monitor air quality in the urban and rural environment. For these purposes two PM sensors Nova PM SDS011 were installed, one in Cietokšņa housing estate, Daugavpils city, another – in farmstead “Putnusala”, Bebrenes rural municipality. The continuous 24h/7d measurements of PM2.5 and PM10 concentrations in the air was carried out since July 2021. Obtained results indicate that for both PM2.5 and PM10 hourly max. concentrations air quality threshold limits were quite often exceeded in urban environments, whilst in the rural environment, these limits were exceeded only occasionally. However, max. concentrations reflect only the short-term peak values which do not characterize the overall situation of air quality. Therefore, hourly average concentrations were analysed too – data indicate that the thresholds specified by regulations were exceeded only once, in Daugavpils city. It allows us to conclude that citizens in SE Latvia were not exposed to the negative influence of PM particles for long period, hence air quality in this region could be assessed as good. At this phase of data analysis statistical correlation between meteorological factors and the PM concentration was not performed yet, thereby it indicates the necessity of further studies.

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TRANSPLANTATION EXPERIMENTS OF THREE RARE EPIPHYTIC SPECIES ALONG DECIDUOUS FOREST CHRONOSEQUENCE

Forestry has a major impact on forest biodiversity and this impact tends to increase. It is important to know the epiphyte ecology in order to be able to sustain them in the long term and plan responsible forest management. Transplantation experiments can help to identify dispersal or microclimatic conditions, which restrict the successful epiphyte distribution between forest stands on suitable substrates (Liden et al., 2004).

The aim of the present study was to characterize the vitality of two rare epiphytic moss (*Lejeunea cavifolia*, *Metzgeria furcata*) and one lichen (*Lobaria pulmonaria*) model species using transplantation experiments in different environmental settings in old-growth deciduous forest stands and managed forest stands. In total 180 samples of model species were transplanted in several *Populus tremula* forest stands, which were divided into three age classes – old-growth, middle-aged and young forest stand. Two epiphyte transplantation methods were used – elastic cotton bandage with staples and “bark disk” method described by Brodo (Brodo, 1961). The first study results after one year of transplantation were analyzed, where the vitality rates of the model species were compared between years along forest chronosequence.

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PRELIMINARY GEOGRAPHIC INFORMATION SYSTEM PANACEA ANALYSIS TO MITIGATE PUBLIC SEWAGE PIPELINE BLOCKAGE

Key words: *Geographic Information System (GIS), blockage, sewage, wastewater, Malaysia*

The paradigmshift in sewage wastewater treatment provides a panacea for cleaner and improved sustainable environment. However, the sewer pipelines medium which transports the wastewater to a central wastewater treatment plant is continually plagued by backups from debris, fats, oils and grease (FOG), tree roots, aged pipes, earth movements, site development, vandalism and poor joints. The sluggish rate in current efforts of curbing, clearing, monitoring and repair leads to undesired waste spillage and detrimental environmental hazards. Therefore, this paper presents a preliminary filtering mechanism model which separates wastewater debris from getting into the public sewer pipe from the private sewer pipes by suspending greasolux cartridges within the mechanism to create a form of meltdown, neutralizing FOG particles that causes clogging in sewer pipes and invariably leads to blockage. Geographic Information System (GIS) is integrated into the pipeline mapping for spatial analysis to monitor and document flow rate characteristics during peak and low wastewater flow. The findings suggest that GIS integration minimises the issues of obstruction along the wastewater pipeline for more effective continuous sewage service. The next phase of the research will be quantitative GIS data observation and monitoring. The model will be of immense benefit to wastewater design decision making, formulation of policies and treatment modifications by all stakeholders.

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YIELD AND STARCH CONTENT OF POTATO GENOTYPES PRODUCED IN THE INTEGRATED FARMING SYSTEM IN SEVERAL REGIONS IN LATVIA

Key words: *potato variety, yield, starch content*

More than 2,000 potato varieties have been developed worldwide. In Latvia, potato breeding has been carried out in the AREI, Research Centre in Priekuli since 1931. Over the years a lot of potato varieties have been developed that are suitable for cultivation in different growing conditions. The territory of Latvia is relatively small, but the growing conditions have always been different between the regions. Potatoes are suitable for the temperate climate, and the optimal conditions for plant growth and development are when the soil temperature is not below 7–8 °C and above 25 °C. The optimum air

temperature for the development of potatoes is 20–21 °C, although the plants start to develop at 5–6 °C and interrupt development when the air temperature reaches 30 °C.

Potatoes need humid soils. The need for moisture is especially significant during flowering when new yield tubers start to develop. The demand for new varieties with high-stress tolerance, high nutrition use efficiency, yield stability is essential in different regions and due to climate changes.

The aim of the study was to assess the yield and quality of potato genotypes in three growing locations. The use of varieties relay on quality traits such as the content of starch and dry matter in tubers. The field trials were established in integrated production system in three regions of Latvia – Vidzeme, Kurzeme, and Latgale. Twenty genotypes were planted in each region: potato varieties: 'Agrie dzeltenie', 'Madara', 'Monta', 'Rigonda', 'Vineta', 'Lenora', 'Prelma', 'Verdi', 'Brasla', 'Jogla', 'Imanta', 'Yelly', 'Magdalena', 'Kuras' and breeding clones: S 03067-33; S 01085-21; S 04065-2; S 11161-85; S 13078-1; S 11152-7. According to data analysis (ANOVA), variety tubers' yields were significantly different between Latvia's regions in 2021 ($p < 0.05$). Mainly the higher yields for potato genotypes were in the Kurzeme region (Stende). There were no significant differences ($p > 0.05$) between potato yields in Vidzeme (Priekule) and Latgale (Viļāni). The highest tuber yield was obtained for the medium late potato variety 'Jogla' (47.5 t ha⁻¹) and an early potato clone S03067-33 (49.30 t ha⁻¹). The starch content was significantly influenced by genotypes ($p < 0.05$) while the location appeared with no significant impact ($p > 0.05$).

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VESELĪBAS APRŪPES ZINĀTNE

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HEALTH CARE SCIENCE

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MEAN CORPUSCULAR VOLUME AND ASPARTATE AMINOTRANSFERASE LEVEL CHANGES AS PROGNOSTIC ETHANOL ABSTENTION DELIRIUM ASSOCIATED FACTORS FOR PATIENTS IN THE INTENSIVE CARE UNIT

In case of chronic alcoholism, if the dose is reduced or alcohol consumption is discontinued, alcohol withdrawal syndrome might develop. It has a diverse range of clinical manifestations, but delirium tremens (DTs) is considered the most dangerous state, mainly because it has a possibly fatal outcome in 5–15% of cases and is considered a medical emergency. Therefore, it's important to predict and prevent DTs. Many interview tools have been created for this purpose, but none of them can be considered objective. As an alternative, various biomarkers may be used, for example gamma-glutamyltransferase, carbohydrate-deficient transferrin and others, but for this specific research I've chosen two different ones – mean corpuscular volume (MCV) and aspartate aminotransferase (AST). Similar studies have shown their prognostic DTs value specifically in trauma patients, in turn the main aim of this study was to research MCV and AST levels in all patients who had been diagnosed ethanol or other various substance intoxication upon admission and had afterwards experienced DTs. A retrospective cohort study was carried out at Riga East University Hospital clinical center "Gaiļezers", gathering data – gender, age, MCV and AST – from the medical records of patients admitted to the Toxicology center for the period from year 2013 to 2017.

Two exposed groups were ethanol abstinence delirium or DTs group (DTs group) and various substance intoxication or abstinence delirium group (group of delirium of various substances). For each exposed group, a control group was created.

Data for 269 patients were obtained in the DTs group, but in the relevant control group – for 480 patients. A total of 63 patients in the group of delirium of various substances were collected and 106 patients in the relevant control group.

The gender and age distribution, as well as the relationship between MCV and AST, were proportionally estimated in the groups studied. Relative risk (RR) of developing delirium was calculated in both exposed groups. Test (MCV and AST changes) sensitivity and specificity as well as the positive prognostic value (PPV) and the negative prognostic value (NPV) were also established.

In the DTs group of 269 patients, 122 (45.35%) cases revealed a change in both indicators, in contrast, 39 (14.49%) individuals in both MCV and AST levels were within normal limits.

In the DTs control group of 480 patients, elevated MCV and AST levels were found in 98 (20.41%) individuals and in 221 (46.04%) patients no changes were detected in MCV and AST levels.

Of 63 patients in the group of delirium of various substances, a combination of elevated MCV and AST levels was found in 6 (9.52%) patients; in 25 (39.68%) cases, both indicators were within the normal range. In the control group of 106 patients, however, changes in both parameters were found in 8 (7.51%) cases; in 76 (71.7%) subjects, both MCV and ASTs were within the normal range.

Accordingly, in the DTs group RR = 2,46 (p < 0.0001), test sensitivity 75,77% (CI 95% = 68,41% – 82,17%) and specificity 69,28% (CI 95% = 63,90% – 74,30%), PPV = 55,45% (CI 95% = 50,81% – 60,00%) and NPV = 85% (CI 95% = 81,03% – 88,26%).

In the group of delirium of various substances RR = 2,03 (p = 0.1540), test sensitivity 19,35% (CI 95% = 7.45% – 37.47%), specificity 90,48% (CI 95% = 82.09% – 95.80%), PPV = 42,86% (CI 95% = 22.05% – 66.54%) and NPV = 75,25% (CI 95% = 71.63% to 78.55%).

In conclusion – a combination of elevated MCV and AST levels is considered a predictive factor for DTs in the presence of ethanol intoxication and if the patient is refrained from using alcohol. Conversely, changes in MCV and AST levels cannot be considered prognostic factors for various substance intoxication or abstention delirium.

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ALCOHOL WITHDRAWAL SYNDROME RELATED SUDDEN DEATH

Key words: chronic alcohol abuse, alcohol withdrawal syndrome, sudden cardiac arrest, cardiopulmonary resuscitation

Introduction. Alcoholism remains a serious issue in the aspect of health care as chronic alcohol abuse frequently results in polymorbid states which are often irreversible, distorting and even fatal.

Case report description. A 49-year-old male seeks emergency medical assistance due to feeling fatigued and anxious; he also complains of heart palpitations for the last 2 weeks and claims he had experienced 3 episodes of unconsciousness the day before. The patient has been consuming alcohol for 2 months with short periods of abstention. He has a known diagnosed of toxic dilatation cardiomyopathy (CMP). Examination reveals arterial blood pressure 155/76 mmHg, sinus tachycardia 101 x/min and ethanol 1.6%.

The patient is taken to the Rīga East University Hospital clinical center “Gaiļezers” Clinic of Emergency Medicine where further investigations are done. Laboratory findings – lactate 10.05 mmol/l, glucose 14.32 mmol/l, potassium 5.86 mmol/l. Electrocardiogram shows sinus tachycardia, incomplete right bundle branch block and non-specific ST-wave changes. Computed tomography for the head visualizes air emboli in the sagittal sinus.

A diagnosis is established: electrolyte disorder, metabolic lactate acidosis and toxic dilatation CMP. The patient is admitted to the Toxicology center where therapy with Sol. NaCl 0.9%, B vitamins, diazepam, clonidine, antipsychotics and omeprazole is prescribed. An afterwards done laboratory analysis shows a D-dimer level of 18.1 µg/ml and a CT pulmonary angiography is planned.

The next morning the patient experiences an episode of sudden cardiac arrest and cardiopulmonary resuscitation is immediately initiated. 40 minutes later asystole occurs and biologic death is stated. Later that day the patient’s wife declines an autopsy in writing.

Conclusion. The complicated clinical findings were most likely ethanol abuse related and mutually stimulating but the reason of sudden cardiac arrest in the given patient will remain unknown. Various possible reasons of why the patient died include massive pulmonary embolism, catheter related venous air embolism, severe uncorrected hyperkalemia, lactic acidosis and other. An autopsy would have served as a learning experience.

Summary. Alcohol abuse related health issues and alcohol withdrawal syndrome may result in life threatening cardiac events if not promptly and correctly treated.

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BREAST CANCER HISTOPATHOLOGICAL AND IMMUNOHISTOCHEMICAL FINDINGS IN LATVIA

Background. Breast cancer is one of the most common cancer type in the world. The chance of getting breast cancer increase after the age of 40. But still breast cancer treatment can be highly effective, if it is identified at an early stage. To identify treatment strategy and prognosis of clinical outcome, molecular classification of breast cancer is important factor.

Aim. The aim of this study was to identify the incidence of breast cancer subtypes and breast cancer relation to the age of women.

Methods. A retrospective cross-section study of patients who underwent breast biopsy. Patient data was collected for a period of 6 months. The age of patients was divided into decades. Cancer types were grouped by histopathological and immunohistochemical findings.

Results. A total of 60 cases were collected (all women). The mean age of patients was 53.02, SD = 9.48 with an age range of 30 to 69 years. Incidence of breast cancer relation to the age of women was: 4 cases (6,6%) in age between 30 and 39 years, 25 cases (41,6%) in age between 40–49 years, 17 cases (28,3%) in age between 50–59 years, 11 cases (18,6%) in age between 60–69 years, 2 cases (3,6%) in age between 70–79 years.

According to histopathological findings 45 patients (75%) had invasive ductal carcinoma, 6 patients (10%) had ductal carcinoma in situ, 6 patients (10%) had invasive lobular carcinoma, 3 patients (5%) had lobular carcinoma in situ. According to immunohistochemical findings 16 patients (26,6%) had Luminal A, 31 patient (51,6%) had Luminal B, 8 patients (13,3%) had triple negative, 5 patients (8,3%) had HER2 enriched breast cancer subtypes.

Conclusions. The highest incidence for breast cancer related to age is between 40 and 59 years. Invasive ductal carcinoma is dominant breast cancer type, means that cancer is diagnosed at an advanced stage. Although Luminal A and Luminal B are two predominant breast cancer subtypes in Latvia Triple negative and HER2 enriched breast cancer subtypes are with relatively high incidence. Thereby, receptor testing takes important part of breast cancer treatment.

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CLINICAL SIGNIFICANCE OF CYTOGENETIC ABNORMALITIES IN CHRONIC LYMPHOCYTIC LEUKEMIA PATIENTS

Objectives: Chronic lymphocytic leukemia (CLL) is clonal lymphoproliferative disease, characterized by accumulation of mature lymphocytes. Course of disease is heterogeneous – from indolent to aggressive, disease, so is patient prognosis. It's important to identify patients risk factors to determine prognosis and select therapy. Genetic abnormalities are present in the majority of CLL and its impact on patients prognosis is being studied. In Latvia CLL patients are being tested for del(13q14), del(11q22-23), del(17p12), 12q trisomy.

Aim: To determine the most common cytogenetic abnormalities in patients from Latvia with CLL and its impact on stage of the disease.

Methods: A retrospective study was conducted at the Pauls Stradiņš Clinical University Hospital Cancer Clinic. 82 patients with diagnosed CLL were enrolled. Patients data, diagnosis, laboratory studies, fluorescent in situ hybridization cytogenetic analysis, imaging studies were studied. Data was processed using IBM SPSS Statistics 22.

Results: 68% of patients had cytogenetic analysis done at the time of a research. 82% had at least one cytogenetic abnormality. The most common was del(13q14), it was detected in 72%. Del(11q22-23) was detected in 24% of patients. Del(17p12) – in 15%. The least common aberration was 12q trisomy – 4% of participants had it.

12q trisomy had statistically significant association with stage II by Rai classification of CLL ($p < 0,001$). Pearson-Chi-Square Test showed no statistically significant association between other chromosomal aberrations and stage of the disease ($p > 0,05$). Statistically significant association was between patients with cytogenetic aberrations and no hepatomegaly ($p = 0,02$). Statistically significant association was found between having del(13q14) and thrombocytopenia – del(13q14) was associated with no thrombocytopenia ($p = 0,02$).

Conclusion: Del(13q14) is the most common chromosomal aberration in CLL patients in Latvia. 12q trisomy patients have advanced CLL stage. Other chromosomal abnormalities do not have direct impact on CLL stage.

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CONTEMPORANEOUS OPINIONS ON CARDIOPREVENTION AND CARDIOREHABILITATION (AND OUR OWN EXPERIENCE)

According American Heart association, Cardiac rehabilitation (CR) is a professionally supervised program to help people recover from heart attacks, heart surgery and percutaneous coronary intervention (PCI) procedures, such as stenting and angioplasty.

Authors discuss some contemporaneous documents: Global burden of diseases study 2019, ESC guidelines 2021, Global Action Plan of Physical Activity 2018–2030.

In 2021 the European Society of Cardiology (ESC) published Guidelines on cardiovascular prevention in clinical practice; elaborated by representatives of the ESC and 12 medical societies. According these data, participation in a medically supervised, structured, comprehensive, multidisciplinary evidence-based cardiac rehabilitation and prevention programme is very important, as recommendation of high class (I or II) and high levels of evidence (A or B). Some recommendations for cardio-vascular diseases risk modifiers are included: stress, plaque detection by carotid ultrasound, RR control). The role of physical activity and exercise is underlined, with recommendations of class I, level A and B.

Physical inactivity is considered as the fourth leading cause of death in the world.

The events for stimulation of physical activity are systematized in the Global Action Plan on Physical Activity (GAPPA 2018–2030), developed by the World Health Organization and the Pan-American Health Organization (PAHO), with an important goal: 15% relative reduction in the global prevalence of physical inactivity in adults and adolescents. Principal initiatives include: create active societies, active people, active environments, active systems.

Results of CR of different types of patients are presented.

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COVID-19 IMMUNIZATION SIDE-EFFECTS IN FAMILY PHYSICIAN'S PRACTICE VACCINATED PATIENTS

Key words: COVID-19, vaccination

Introduction. Although COVID-19 vaccines were researched, evaluated and approved by regulatory authorities Worldwide, there still have been many concerns from public about vaccine safety and possible side-effects.

Objectives. The aim of this study was to determine adverse effects and their frequency after COVID-19 vaccination with Comirnaty, Spikevax or Vaxzevria vaccines in Family physician's practice patients.

Methods. A prospective longitudinal study of 288 patients was conducted in 2 General practitioner's offices during COVID-19 vaccination. An interview of participants was conducted before vaccination to obtain brief history. After vaccination patients were interviewed again to obtain information about changes in their health to determine side effects of vaccination.

Results. 184 female and 104 males were included in the study with mean age of 53 years. 121 patients received Comirnaty, 82 Spikevax and 85 Vaxzevria vaccine during first two vaccinations. 61,11% of participants reported side effects after 1st dose and 48,26% after 2nd dose regardless of the vaccine. After 1st and 2nd vaccination with Comirnaty 75,21% of participants reported side-effects, 84,15% after being vaccinated with Spikevax and 49,41% after at least one Vaxzevria vaccination. Out of 235 of participants who received 3rd dose with Comirnaty or Spikevax vaccines 102 reported at least one side-effect. More specifically 39,26% complained about side-effects after Spikevax and 52,17% after Comirnaty vaccine. The main complaint in all three vaccinations being pain in the arm in 43,11% after first vaccination, 32,88% after 2nd and 34,23% after 3rd vaccination with mean time of one day after vaccination.

Conclusions. The study showed that after COVID-19 vaccines there might be side-effects independently of vaccination dose. This study shows less side-effects after vaccination than reported in literature. The reported side-effects were mild, lasting on average one day.

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D VITAMIN LEVEL AND THE RISK OF DEVELOPING ARTERIAL HYPERTENSION

Background. In recent years, evidence of vitamin D involvement in cardiovascular disease (CVD) pathogenesis has been growing. Thus, there was an interest in studying and identifying the association between 25 (OH) D levels and the risks of arterial hypertension in the family doctor's practice.

Aim of the study. To determine whether Professor's A. Požarsky's family doctor practice patients has an association between 25 (OH) D levels and the risk of developing arterial hypertension.

Methodology. The study included patients from the family practice of A. Požarsky, who had to give a blood test in a laboratory to the level of vitamin D in the blood. Data from the patient's outpatient card were analyzed: gender, age, body mass index (BMI), glomerular filtration rate (GFR), AH history. Data has been analysed by using MS Excel and SPSS 20.

Results. 268 participants participated in the study. The average patients age was 54.1 years. 74.6% were women. The average level of vitamin D in the study population is 25 ng/ml. OR in hypertension

was not inversely related to increasing vitamin D levels. In multi-factor analyzes, adapting age, gender, BMI and renal filtration covariates, OR also had no statistically significant increase. The relevant hypertension ORs were 1.8 (0.4-7.5), 1.1 (0.3-4.5), 1.7 (0.4-7.2) and 0.7 (0.1-4.8) 30 ng/ml to 45 ng/ml, 20 to 29 ng/ml, 10 to 19 ng/ml, and <10 ng/ml compared to the group ≥ 45 ng/ml.

Conclusions. There is no association between 25 (OH) D levels and the risk of developing arterial hypertension in our study.

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DIETARY SUPPLEMENTS CONTAINING VITAMINS AND GENERAL PHYSICAL HEALTH AMONG MEDICAL STUDENTS AND YOUNG DOCTORS

Introduction. Intake of dietary supplements containing vitamins is believed to have a health promoting effect. Nowadays there is a wide range of food supplements available in any pharmacy or even in grocery stores. Therefore, many people in general public use them without consulting a specialist. But what about young doctors and medical students?

Aim. To investigate the relationship between use of dietary supplements containing vitamins and general physical health among medical students and young doctors.

Materials and methods. A cross-sectional study using Google Forms. The questionnaire consisted of demographic data and included inquiries regarding use of dietary supplements containing vitamins. To assess level of general physical health PHQ scale (Physical Health Questionnaire) was used.

Results. 291 responders - 9.3% (n=27) male and 90.7% (n=264) female. Age range of responders was from 20 to 32 years. Of all responders 21.6% (n=63) were young doctors and 78.4% (n=228) - medicine students. 92.8% (n=270) of responders used dietary supplements containing vitamins, 156 used them every day. 0.5% (n=3) of doctors were not taking any additional vitamins, among students - 7.9% (n=18). Three most frequently used vitamins were vitamin D (used by 261 responders), vitamin C (used by 123) and vitamin B (used by 102). 225 responders had determined their vitamin D level before its use, 33 responders - vitamin B12 level and 27 responders - folic acid level. Mean value on PHQ scale for whole group of participants was 69.06 (SD 11.09) points. For responders, who use vitamins - 69.29 (SD 11.10) points and for those who don't - 64.29 (SD 10.55).

Conclusion. Most of medical students and young doctors use dietary supplements containing vitamins. The most frequently used vitamin among all participants was vitamin D. The group of participant who used dietary supplements containing vitamins had slightly higher score on PHQ scale that implicates better general physical health.

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FACTORS ASSOCIATED WITH PARTICIPATION IN CERVICAL CANCER SCREENING AMONG LATVIAN WOMEN

Introduction. In Latvia cervical cancer (CC) is the second leading cause of cancer deaths in women aged 15 to 44 years. With regular CC screening precancerous conditions and early stages of CC can be identified and treated to decrease mortality.

Aim. To evaluate the factors associated with women participation in CC screening.

Materials and Methods. Participants of this cross-section study were recruited by 9 general practitioners all over Latvia and by gynecologists in the central Colposcopy Clinic in Latvia. Women filled out anonymous questionnaire. Frequencies (%) were calculated to detect the total and stratified lifetime cervical cancer screening prevalence. Univariate and multivariate binary logistic regression analysis was used to identify factors associated with participation in CC screening program. SPSS 28.0 software was used for data processing. Results were considered as statistically significant if $p < 0.05$.

Results. The data is preliminary (the research is ongoing). 406 women participated in the study (out of total sample – 1500), aged between 25 and 70 years. The study showed that 87.9% of participants had ever participated in CC screening. Although in univariate analysis younger age, Latvian nationality, higher education, nonsmoking and non-binge-drinking statuses and knowledge about screening program and HPV vaccine were significantly associated with higher odds of participation in screening program, after adjustment for all the independent variables only age and knowledge about screening program remained significant. The odds of screening attendance were 9.1 ($p=0.003$) and 4.5 ($p=0.3$) times higher for women aged 36–45 years and 46–55 years respectively (vs. 56+). And odds were 70% lower ($OR=0.3$, $p=0.02$) for those not knowing that women of age between 25 and 69 years in Latvia are invited to screening once per 3 years.

Conclusions. Knowledge about screening program and younger age are the main factors associated with participation in cervical cancer screening. Providing targeted health education for senior women could increase screening coverage.

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FACTORS CONTRIBUTING TO FEMALE VAGINAL MICROFLORA ALTERATIONS AND INTIMATE HEALTH

Key words: health, women, gynecology, microflora, vaginal pH

Introduction. Women's vaginal flora is an important health issue and has an impact on women's well-being, though changes in vaginal flora not only cause discomfort but potentially increase the risk of infections and have an impact on women's fertility. Vaginal flora is influenced by different factors like eating habits, hormonal changes, hygiene, stress, etc. An acidic vaginal pH and lactobacilli are components of multiple mechanisms to sustain normal vaginal flora.

Aim. The aim of this study is to investigate the role of intimate hygiene products on vaginal pH, as well as subjective symptoms of vaginal discomfort.

Materials and methods. Double-blind, randomized prospective study of 52 women of reproductive age with no subjective symptoms of genital tract infection. 26 women used the newly designed product "A" and the other 26 women used an already existing product "B". Use of products was blinded for researchers and participants. Participants used the same intimate hygiene products for 4 weeks. Vaginal pH was measured on the first enrollment visit and after four weeks of product use. During the study, participants filled out the questionnaire about intimate hygiene product use once a week.

Results. At the beginning of the study, the average pH measurement in both groups was 4.30 (± 0.45), 4 weeks after using products A and B it was 4.12 (± 0.37). In both groups, there is a tendency to get a lower pH level, in group A it has a statistically higher reliability. Product A in 4 weeks has been able to lower the pH by 0.26 (95% confidence interval 0.12-0.40), compared to the product, which reduced the pH by 0.09 (95% confidence interval 0.08-0.5). In general, there is no significant difference between the efficacy of the products evaluated by the patients themselves ($p=0.21^{**}$). At weeks 1 and 4 the median score was 0 (IQR 0-3) for group A and 0 (IQR-0.75-1) for group B.

Conclusion. The use of specifically designed intimate hygiene products can improve vaginal pH towards more acidic, potentially improving vaginal flora and having a significant impact on the woman's well-being.

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FREQUENCY AND VARIETY OF ALLERGIC REACTIONS IN PATIENTS IN THE EMERGENCY DEPARTMENT

Key words: allergies, anaphylaxis

Introduction. The problem of the research is topical, because in the 21st century people are more and more allergic to modern everyday life, to household chemicals, insect bites and other factors caused by weakened immune system. Patients often are unaware of their allergies (especially adults), because they haven't been tested before and first reaction happens unexpectedly, they have to call State Emergency medical service. The authors are currently working in State Emergency medical Service. The aim of this study is to identify most common call motives in State Emergency medical Service what are connected to allergies and anaphylaxis in 2017, 2020 and 2021.; to identify how often Latvian inhabitants calls in State Emergency medical Service are related to allergic reactions; to find out if allergies are connected to season and weather.

Materials and methods. Quantitative research - analyzing electronic cards in State Emergency medical Service what are connected with allergies and anaphylaxis in 2017, 2020, 2021. Summarize the results.

Results. Summarized data from electronic cards in State Emergency medical Service.

Conclusion. The most common form of allergic reactions in State Emergency medical Service is anaphylaxis. The number of calls related to allergic reactions in the pre-hospital phase is related to seasonality - the number of calls are higher in the warm weather.

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FREQUENCY OF DIFFERENT TYPES OF ABNORMALLY INVASIVE PLACENTA CONFIRMED BY MAGNETIC RESONANCE IMAGING

Background: Abnormally invasive placenta (AIP) is utilized to clarify a placenta that does not separate naturally once delivery and cannot be extirpated while not inflicting abnormally high blood loss. Three variants of abnormally invasive placentation are recognized: placenta accreta, within which placental villi invade the surface of the myometrium; placenta increta, within which placental villi extend into the myometrium; and placenta percreta, wherever the villi penetrate through the smooth muscle to the female internal reproductive organ serous membrane and could invade adjacent organs, like the bladder. Placenta accreta, increta, or percreta is related to major physiological condition complications and dangerous maternal hemorrhage, large-volume insertion, and peripartum extirpation. Early designation of placental growth is unbelievably necessary as a result of abnormally invasive placenta affects the clinical outcome. It will facilitate professionals to prepare in time and supply the best surroundings for delivery. All of this might scale back the number of hysterectomies, leading to dangerous hurt more attributable to physiological state later in life.

Aim: This study aimed to the fact that victimization these standardized magnetic resonance imaging descriptors for AIP are helpful for clinical use, education, teaching, and future analysis comes, so assumably up the care of patients with this condition. Additionally, victimization uniform language for AIP ought to become the primary step of a regular magnetic resonance imaging report.

Methods: A retrospective cross-sectional study analyzing records of eighty-eight patients (women) at procreative age 18–55 y.o., undergoing magnetic resonance imaging to Pauls Stradins Clinical University hospital Diagnostic Radiology institute. Hospital information systems databases were used to urge info on the patient's age, the number of pregnancies, previous caesareans, medical specialty pathologies, and previous surgical treatments. As a result, the frequency of every variety of placenta followed was compared.

Results: Thirty of eighty-eight patients were confirmed with AIP pathology. Consistent with magnetic resonance imaging information, the foremost common variety of AIP is placenta accreta 80% (24 patients). The all-time low variety of AIP that was performed on magnetic resonance imaging was placenta percreta. This sort of AIP was found in 3.3% (1patient) cases. Additionally, placenta increta was diagnosed in 16.7% (5 patients).

Conclusion: Placenta accreta, placenta increta, and placenta percreta became additional frequently, primarily because of the increasing cesarian rates. Magnetic resonance imaging will increase the accuracy of the workup of speculative patients and aids in multidisciplinary delivery planning to improve maternal outcomes. Accuracy and confidence need adherence to examination performance, image interpretation criteria, and awareness of common pitfalls.

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FREQUENCY OF TPMT AND NUDT15 VARIATIONS IN THE LATVIAN POPULATION

Background: Azathioprine is an immunosuppressant used to manage autoimmune and inflammatory conditions and prevent a transplant rejection. Patients with thiopurine S-methyl transferase (TPMT) or nucleotide diphosphatase (NUDT15) deficiency may have an increased risk of severe adverse drug reactions (e.g., myelosuppression) while receiving conventional doses of azathioprine (AZA). *TPMT* and *NUDT15* genetic testing for most common variants resulting in *TPMT* and *NUDT15* deficiencies before initiation of AZA is recommended to reduce adverse drug reactions risk. Heterozygous carriers

of *TPMT* or *NUDT15* deficiency-causing variants are advised to have a reduced dose of AZA, while AZA is contraindicated for individuals with complete *TPMT* or *NUDT15* deficiencies (due to biallelic variants).

Aim: The aim of this study was to evaluate *TPMT*, *NUDT15* clinical variants prevalence in the Latvian population.

Methods: We have used an in-house database of exome sequencing data from 455 anonymous Latvian individuals referred to the Riga Stradiņš University Scientific laboratory of molecular genetics for different research projects with various phenotypes. This data allowed us to analyse not only the most common (in the European population) *TPMT* clinically relevant alleles (*2, *3A, *3B, 3C) and *NUDT15* (*2, *3), but also rare *TPMT* and *NUDT15* alleles. Genetic variant information was combined and analysed only on the group level, and individual-level information was not available to ensure individuals confidentiality.

Results: Out of the 455 analysed individuals, 433 (95.2%) were wild-type (*TPMT**1/*1), and 22 (4.8%) carried a *TPMT**3C allele. No *TPMT**2, *TPMT**3A, *TPMT**3B, or other rare alleles were found. Of the 455 patients, 453 (99.6%) were wild-type (*NUDT15**1/*1) and 2 patients (0.4%) were heterozygous for *NUDT15**3. No *NUDT15**2 or other rare alleles were found.

Conclusion: Homozygous *TPMT* and *NUDT15* deficiencies are very rare in the Latvian population. Partial deficiencies in total are present in ~5.2% of individuals in the Latvian population, meaning that ~5% of individuals receiving AZA are at high risk of severe adverse reactions.

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IMPACT OF A COSMETIC PRODUCT CONTAINING DRACOCEPHALUM RUYSHIANA EXTRACT ON BIOPHYSICAL PARAMETERS OF THE SKIN

Key words: dermatology, hydration, *Dracocephalum ruyschiana*

Introduction: Skin changes with age, it produces less collagen, elastin and hyaluronic acid, loses elasticity, becomes drier and these changes can affect the quality of life. *Dracocephalum ruyschiana* callus culture extract has demonstrated in studies (in vitro) that it promotes the proliferation of keratinocytes and dermal fibroblasts, stimulates collagen synthesis and inhibits its degradation, protects the skin from ultraviolet radiation induced oxidative stress, inhibits endothelial cell proliferation and neoangiogenesis.

Materials and methods: Participants (N=42) were asked to apply two test products on a clean facial skin twice a day. The test products were marked – one for the left side of the face and the other one for the right side of the face. Only one of the both cosmetic products contained *Dracocephalum ruyschiana* extract, participants didn't know which one of the both products contains a plant extract. Instrumental assessment of hydration, viscoelasticity (R2, R5, R7), pigmentation and erythema parameters was made using Corneometer CM 825, Cutometer dual MPA580 and Mexameter MX18 (Courage + Khazaka GmbH, Germany). Parameters were evaluated three times: before using cosmetic products (day 0) and after 4 and 8 weeks of regular everyday use of the test products. Six measurements were made during each visit: three on the participant's right cheek and three on the left cheek to determine skin hydration, viscoelasticity, pigmentation and erythema parameters. The assessment also included standardized photography during each visit using Reveal Imager. At the end of the study, participants answered written questions about the cosmetic products and its effectiveness. Independent and paired sample T-test was used for analysing collected data. P value < 0,05 was considered statistically significant.

Results: Statistically significant increase in the skin hydration level was observed on the left side of the facial skin in the start of the study (day 0) (46,52, SD=9,61) compared to the hydration level after 8 weeks (55,75, SD=10,99), p=0,000107. Statistically significant increase in the skin melanin level was

observed on the both sides of the participants facial skin – on the left side in the start of the study (day 0) (137,61, SD=25,50) compared to the melanin level after 8 weeks (153,10, SD=34,67), $p=0,001335$ and on the right side of the facial skin in the start of the study (day 0) (137,76, SD=23,96) compared to the melanin level after 8 weeks (156,64, SD=34,05), $p=0,000643$. The increase in the skin melanin level was explained by the summer season when the measurements were made.

Conclusions: Everyday use of cosmetic product containing *Dracocephalum ruyschiana* extract leads to improvement in hydration level of the skin.

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IMPACT OF PERIOPERATIVE GABAPENTIN ON POSTOPERATIVE PAIN AFTER SPINAL SURGERY

Key words: *postoperative pain, multimodal analgesia, gabapentin, spine surgery*

Background. Spine surgeries are one of the most complicated and painful procedures. One of the multimodal analgesia components is gabapentinoid group medications which affect the nociceptive process and are used in postoperative pain relief. Using single gabapentin dose in multimodal analgesia model has positive impact on postoperative pain.

Aim. The purpose of this study was to analyze the efficiency of gabapentin on postoperative pain after spinal surgery.

Methods. A retrospective cross-section study of patients who have undergone spine surgical procedures. The evaluation of pain intensity was carried out using the Visual Analogue Scale (VAS). In this study, independent Samples Mann-Whitney U test was used.

Results. Forty-three patients, of which 24 are male, and 19 female who have undergone spine surgery, were allocated into two groups; the first group of 22 patients received gabapentin, and the second group of 21 patients did not receive it.

On the surgery day, mean pain scores were 3.65 (95% CI; 2.65-4.64) for the gabapentin group, when compared with results of patients that did not receive gabapentin pain scores were 4.16 (95% CI; 3.18-5.18) $p = 0.48$. The difference wasn't significant.

The difference was statistically significant on the first postoperative day; the gabapentin group mean pain score results were 2.47 (95% CI; 1.75-3.20), and for the patients without gabapentin, results were 3.66 (95% CI 2.78-4.54). $p < 0.04$.

Result for the second postoperative day was 1.83 (95% CI; 0,15-3,51) for patients that received gabapentin and 1.83 without (95% CI; 0.07-3.59) $p = 1.0$ which isn't statistically significant.

Conclusion. Using gabapentin in the multimodal analgesia model for postoperative has significantly reduced the pain intensity and demonstrated significant benefits on the first postoperative day. Results for pain scores shows that the operation and second postoperative days weren't statistically significant.

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IMPACT OF PHYSICAL MODALITIES IN THE COMPLEX TREATMENT OF LIPOATROPHIA SEMI-CIRCULARIS (WITH A CASE REPORT)

Lipoatrophy (LA) is a loss of fat, with subsequent depression in the skin. It is considered as a condition, result of other conditions. Can occur at any age. LA is most common in females (because they have fewer muscles under the subcutaneous layer). Different types of lipoatrophy are described: localized, partial or total.

Semicircular LA (lipoatrophia semi-circularis) is a rare disorder, increasingly detected amongst female office workers, characterized by the appearance of indentations in one or both thighs (as result of localized loss of subcutaneous fat). Authors consider that this condition is caused by various mechanisms, generated in the workspace: interactions with electro-magnetic fields (electrostatic hypothesis), localized pressure (micro-traumatization).

Traditionally, every type of LA is treated by: Collagen, Hyaluronic acid, Calcium hydroxyapatite (injections), or Surgery. We consider that some physical modalities can be useful in the complex treatment of LA.

We present a case of a 32 years woman, office worker, suffering of "ribbed thighs" with horizontal bands (indentations) in the anterior, antero-medial and antero-lateral areas of the thigh, at the office desk height (approximate height 70 cm from the ground). We applied a rehabilitation complex of regular physical activity (including swimming), analytic exercises, manual massage, lymphatic drainage, endermology and endermotherapy (LPG), diet (rich in fibers, fruits and vegetables, poor in lipids), mineral water. After a period of 45 days we observed a re-sculpture of the lower extremities with decrease of the "ribbed zones", reduction of the lobular panniculitis, improvement of the skin tonus and elasticity.

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IMPACT OF THE COVID-19 PANDEMIC ON MENTAL HEALTH OF MEDICAL STUDENTS AND RESIDENTS IN LATVIA

Key words: anxiety, coronavirus, depression, medical, pandemic, students, Covid-19

Objective: COVID 19 has spread worldwide over the last 3 years and caused massive damage to humanity. This situation can cause distress among people, especially health care workers. The aim of this study was to determine how the COVID 19 pandemic affected medical students and medical residents in Latvia before and during the pandemic.

Method: This study was conducted in Latvia from October 2019 to January 2020 and November 2021 to February 2022 using survey design. Questions were taken from GAD-7 Anxiety scale and from PHQ-9 Depression scale. Data were analyzed using IBM SPSS.

Results: Total of 702 respondents completed the survey. 364 of them before and 338 during pandemic. Anxiety symptoms were higher in respondents who took survey before pandemic 2,24% ($p>0,05$) and depression symptoms were 4.9% ($p<0,0001$) severe with those respondents who completed survey before COVID 19.

Conclusion: Depression symptoms were more severe with those respondents who completed survey before COVID 19 pandemic and the difference was statistically significant. Self reported anxiety

symptoms were less severe during pandemic, but the difference was not statistically significant between those two time periods.

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INDUCTION CHEMOTHERAPY RESPONSE IN LOCALLY ADVANCED HEAD AND NECK SQUAMOUS CELL CARCINOMA

Aim: To assess response to induction chemotherapy (IC) in locally advanced head and neck squamous cell carcinoma (LA-HNSCC).

Methods: The study included patients diagnosed with HNSCC between 2019 and 2021 in Pauls Stradiņš Clinical University Hospital, who underwent IC with docetaxel, cisplatin and 5-fluorouracil.

Results: From 27 patients with LA-HNSCC who received IC, 22 have completed therapy. There were 14 (63,6%) men and 8 (36,4%) women. Mean age was 55,4 years (SD 8,9; range 35–71 years). In most cases (n=19; 86,4%) disease was diagnosed at stage 4 and in 3 cases (13,6%) at stage 3. Most patients were in good performance status – ECOG 0 (n=13; 59,1%) and 1 (n=6; 27,3%). Predominantly cancer was moderately differentiated (n=16; 72,7%). Nineteen patients (86,4%) received standard dose chemotherapy and 3 patients (13,6%) received reduced dose. Ten patients (45,5%) received 4 cycles, 9 (40,9%) received 3 cycles and 3 (13,6%) received 2 cycles of IC. At radiological re-evaluation complete response was observed in 1 case (4,5%), partial response in 14 (63,6%), stable disease in 3 (13,6%) and progressive disease in 4 cases (18,2%). After completion of IC 13 patients (59,5%) underwent operative treatment. Pathological complete response was observed in 2 (15,4%) and partial response in 11 cases (84,6%). There was not found statistically significant association between sex, age, performance status, cancer grade, stage, received IC dose, cycles and response to IC.

Conclusions: IC is efficient in disease down-staging in LA-HNSCC. Further research should be done to identify potential factors that may predict better response to IC.

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INFECTIONS IN PATIENTS WITH ACUTE STROKE

Key words: stroke, infections, complications, NIHSS

Abstract body. Acute stroke is the main cause of death and functional diasability worldwide. Patients with acute stroke are at increased risk of intrahospital infections. These infections are associated with adverse patient outcomes and increase healthcare costs. Studying about infections, their frequency and risk factors in patients with acute stroke, it would be possible to improve patients quality of life and predict the possible development of infection.

Objectives. The aim of this study was to investigate infections and their frequency in patients with acute stroke.

Materials and Methods. The study was conducted during the period from October 2021 to March 2022 at the Riga East Clinical University Hospital. In the study were used patient medical records available in archive (diagnosis SSK – 10 I64, time period from September 2020 to September 2021). Data included in the study – stroke type, comorbidities, infection, topography of infection, agent, antibacterial agents, outcome.

Results. The study included 605 patients with a diagnosis of acute stroke, 269 men and 336 women. The minimum age of patients is 31 years and the maximum is 96 years. 76.5% (n = 464) were not

diagnosed with infection, 23.3% (n = 141) were diagnosed with infection. Of the patients diagnosed with infection, 47.5% (n = 67) had a urinary tract infection, 22.7% (n = 32) had a respiratory infection, 22.0% (n = 31) had no localization of the infection, 5.7% (n = 8) sepsis, 0.7% (n = 1) soft tissue infection, 0.7% (n = 1) neuroinfection, 0.7% (n = 1) thrombophlebitis. Statistically significant risk factors and comorbidities in patients with acute stroke and infection were nicotine (x² = 11.365 df = 1 p <0.001) weak association, gender (x² = 10.435 df = 1 p <0.001) weak association, chronic kidney disease (x² = 11.365 df = 1 p <0.001) weak association, atrial fibrillation (x² = 9.569 df = 1 p = 0.002) weak association, neurodegenerative disease (x² = 8.764 df = 1 p = 0.003) weak association, nasogastric tube (x² = 41.193 df = 1 p <0.001) moderate association, dysphagia (x² = 40.171 df = 1 p <0.001) moderate association, intubation (x² = 5.714 df = 1 p = 0.017) weak association, bladder catheter (x² = 63.899 df = 1 p <0.001) moderately close association, immobility (x² = 57.974 df = 1 p <0.001) moderately close association, bedsores (x² = 56.009 df = 1 p <0.001) moderately close association, number of bed days in hospital (x² = 17.531 df = 3 p <0.001) weak association, the modified Rankin scale (mRS) in patients with acute stroke is a moderately strong association with severe functional disability (x² = 33.312 df = 5 p <0.001). There is a statistically significant ratio (p <0.001) for patients without infection with a mean NIHSS 6, a score of 4 to 10, and for those with an infection a mean NIHSS 10, a score of 6 to 15.

Conclusions. In patients with a diagnosis of acute stroke, the most common infections are urinary tract and respiratory infections, for the development of risk factors include chronic kidney disease, nicotine, bladder catheterization, immobility, nasogastric tube, dysphagia. The mean NIHSS value in a patient with an acute stroke without infection is 6, but in a patient who has already been diagnosed with an infection or will develop during hospitalization, the average NIHSS is 10. As a result, the number of hospital stays in patients with acute stroke and infection increases. In patients with acute stroke and infection, the modified Rankin scale is a severe functional disability that indicates that NIHSS and mRS can be used as a prognostic indicator for the development of infection in patients with acute stroke.

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INFLUENCING FACTORS AND FREQUENCY OF HYPOALBUMINEMIA FOR PATIENTS IN PERIOPERATIVE PERIOD HAVING ELECTIVE OPEN-HEART SURGERY IN CARDIOPULMONARY BAYPASS

Objectives: Aim of this study was to estimate and analyze influencing factors and frequency of hypoalbuminemia in patients before and after elective open-heart surgery in cardiopulmonary bypass (CPB).

Materials and Methods: A retrospective study was developed, which summarizes and analyses data of 120 patients who were admitted to Pauls Stradins Clinical University Hospital, Center of Cardiac Surgery for elective open-heart surgery in CPB between 1st November 2021 and 28th December 2021. Analyzed parameters that were included – gender, age, body mass index (BMI), co-morbidities, planned surgery type, pre-operative blood tests, intra-operative variables and post-operative blood tests 6 and 12 hours after surgery. For statistical analysis IBM SPSS Statistics 27.0 was used.

Results: Medical history data from 97 patients were used for analysis due to lack of available data in 23 patients. From all analyzed data only 1 patient (1.03%) had hypoalbuminemia when admitted to hospital.

Hypoalbuminemia was developed in 38 (39.2%) patients 6 hours after surgery and in 50 (51.5%) patients after 12 hours. From 50 patients who developed hypoalbuminemia 12 hours after surgery none had severe serum albumin deficit (<25 g/L), 4 had moderate (25–29.9 g/L), 46 had low deficit (30–34.9 g/L).

In intra-operative values statistically significant correlation was found for patients with longer CPB time (*Median (Q₁-Q₃) = 90 min (74-119) for hypoalbuminemia vs 82 min (69-102) for normal albumin*

level; $r = -0.207$, $p = 0.042$) as well as higher intra-operative fluid balance had lower albumin levels 6 hours after surgery (*Median (Q₁-Q₃) = 853 ml (77-1100) vs 647 ml (181-1065)*; $r = -0.200$, $p = 0.049$). There was no statistically significant influence by pre-operative factors (gender, age, BMI, comorbidities, blood tests) on hypoalbuminemia.

Conclusions: Hypoalbuminaemia is one of the most prevalent disorders in hospitalized and critically ill patients and also is associated with increased morbidity in surgical patients. Before elective open-heart surgery hypoalbuminemia in patients is not common. However, 51.5% of patients develop hypoalbuminemia 12 hours after surgery. The incidence and the degree of hypoalbuminemia in the postoperative period of cardiac surgery may be associated with the development of several complications and worst outcomes, also in long-term survival. Pre-operative factors do not significantly affect hypoalbuminemia's frequency. Mainly associated intra-operative factors for hypoalbuminemia were CPB time and intra-operative fluid balance.

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IS PROLONGED PREOPERATIVE ANTIMICROBIAL PROPHYLAXIS AFTER MAJOR LOWER EXTREMITY NECESSARY? A FOUR-YEAR SINGLE INSTITUTION TRIAL

Introduction. Surgical site infection (SSI) is one of the leading surgical complications. SSI is the third most frequent intrahospital infection. SSI increases hospital stay and mortality. SSI is preventable with preoperative antibiotic prophylaxis. There is an ongoing discussion about prolonged preoperative antimicrobial prophylaxis for certain types of surgery. Unnecessary use of antibiotics gives rise to antimicrobial drug resistant bacteria. It is a rising and important public health concern.

Objective. Compare 7-day cefazoline treatment plan vs one day preoperative prophylaxis in preventing SSI and systemic infection after major lower extremity amputation.

Methods and materials. Trial was conducted in Riga East clinical university hospital from 2018 to 2022. Before major lower extremity amputation patients were randomly assigned to one of the two study groups. Cefazoline prophylaxis group received 1 dose 2 g intravenous cefazoline preoperatively. Cefazoline 7-day treatment plan received cefazoline preoperatively and additionally 4 grams intravenously per day for next 6 days. Data was acquired about infection risk factors. Preason Chi square, logistical regression and Mantel-Haenszel test was used for data analysis. Level of statistical significance: $p < 0.05$. Data analysis performed with IBM SPSS 23.

Results. 191 patients admitted to study (prophylaxis group $n=88$, 7-day course group $n=103$). Average age: 77 y. ($SD \pm 9.8$). 22 patients were excluded. Pearson Chi square test found no statistical significance between treatment group and SSI ($p=0.2$). Amputation stump hematoma or trauma had greater chance or SSI ($p=0.048$, $OR=4.4$, $95\% CI=1-17.9$). Mantel-Haenszel found no significance between age and SSI ($p=0.2$) vs systemic infection ($p=0.8$) and risk factors (≤ 1 vs ≥ 2 risk factors) and SSI ($p=0.1$) vs systemic infection ($p=0.8$).

Conclusion. In lower limb amputation antibiotic prophylaxis is not inferior to prolonged antibiotic treatment.

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KI-67 AS A PROGNOSTIC PARAMETER IN TRIPLE NEGATIVE BREAST CANCER PATIENTS IN PAULS STRADIŅŠ CLINICAL UNIVERSITY HOSPITAL CANCER CLINIC IN 2018–2020

Key words: breast cancer, KI67 index, disease free survival

Background: Triple-negative breast cancer (TNBC) is a subset of breast cancer that is estrogen, progesterone receptor and HER2 protein negative and it is known to be more aggressive, carry a poor prognosis because of lack of targets for hormonal therapy and is more likely to recur than cancers that are hormone receptor positive and/or HER2 positive. Ki67 is a nuclear protein that is associated with cellular proliferation, which leads to high possibility of Ki67 role as prognostic marker in TNBC patients.

Aim: To analyze association between Ki67 and clinical-pathological criteria and Ki67 role as independent prognostic parameter for disease free survival (DFS) in TNBC patients.

Methods: A retrospective study was conducted at the Pauls Stradiņš Clinical University Hospital Cancer Clinic. 120 patients, with histologically confirmed TNBC without distal metastases, which received neoadjuvant chemotherapy and surgical treatment at the time period from 2018 to 2020, were enrolled. KI67, TNM, Grade, oncomarker levels, blood count, Miller-Payne index, performed imaging studies for disease progression or recurrence were studied. For data analyses participants were divided into 3 groups based on their KI67 values (<20% low, 21–45% medium, >46% high). Data was processed using IBM SPSS Statistics 22.

Results: Pearson-Chi-Square Test showed statistically significant association between KI67 index and Grade ($p=0.000$), CA125 ($p = 0.007$), Leu count ($p=0.026$), Miller-Payne index ($p=0.027$). There was not statistically significant association between KI67 and DFS ($p=0.710$).

Conclusion: KI67 association with grading reinforces the assumption of similar behavior of these two parameters. Association with Miller-Payne index shows KI67 as significant predictive factor for the response to neoadjuvant chemotherapy. KI67 doesn't play a role as independent prognostic parameter for DFS.

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LATE ONSET HYPOGONADISM AFFECTS ONLY ELDERLY MEN WITH CO-MORBIDITIES

Aim of the study. To investigate frequency of late onset hypogonadism (LOH) among healthy elderly men, and among men with different co-morbidities.

Materials and Methods. 1852 men age 40–70 years attending primary health care. Men filled out the Aging Male Symptoms (AMS) scale questionnaires. Furthermore, 1340 men with positive AMS were invited to participate in the study, and 1222 men agreed. These men were investigated by general practitioner, and provided morning blood samples for general blood test, lipid profile, glucose levels, and assessment of both total and free testosterone (T) levels. LOH was diagnosed if total T ≤ 3.46 ng/ml, or free T ≤ 72 pg/ml.

Results. Out of 1222 men, 820 men were found to have different co-morbidities (HOPD, ED, compensated type II diabetes, metabolic syndrome), and 402 were found healthy. LOH was detected

in 55% of all men. Only 5% of healthy men were diagnosed with LOH, whereas among men with comorbidities 79% of men could be diagnosed with LOH.

Conclusions. 1) AMS scale is not very sensitive to detect LOH since 33% with positive AMS could not be diagnosed with LOH according to T levels; 2) LOH is infrequent (5%) among healthy men at the age of 40–70, whereas it can be found in more than 2/3 of such men suffering from different comorbidities.

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LIPID PROFILE ANALYSIS IN ATRIAL FIBRILLATION PATIENTS WITH TYPE 2 DIABETES MELLITUS

Key words: atrial fibrillation, lipid profile, type 2 diabetes mellitus

Objectives. Atrial fibrillation (AF) is one of the most common arrhythmias, that can lead to death. Type 2 diabetes mellitus is a lifelong disease with complications, that can be life-threatening.

The aim of our study was to compare lipid profile: triglycerides (TG), total cholesterol (TC), high-density lipoprotein (HDL) and low-density lipoprotein (LDL) levels in AF patients with and without type 2 diabetes mellitus.

Materials and methods. We analyzed patients with AF. Inclusion criteria was persistence of ICD-10 diagnostic codes: I48.0, I48.1, I48.2 or I48.9. The participants were divided into 2 groups: those, who had type 2 diabetes mellitus (DM2) and those, who did not have type 2 diabetes mellitus (NDM2).

Data analysis was carried out using Microsoft Excel and IBM SPSS v27.0. Mann-Whitney test was used to determine statistically significant differences.

Results. 499 patients participated in this study. 45.10% of them were females (n=225). Mean age was 69.17 (SD=10.90) years. 22.00% (n=110) of participants had DM2, from them 75.5% (n=83) were on insulin therapy. 44.00% (n=171) of patients were females in DM2 group; mean age was 69.02 (SD=11.21) years. In addition, 49.10% (n=54) of participants were females in NDM2 group; mean age was 69.71 (SD=9.74) years.

Normal mean TG level was observed in NDM2 group, respectively, 1.50 mmol/L (SD=0.96), whereas it was elevated in DM2 group – 1.66 mmol/L (SD=0.80) (p=0.005).

In both groups normal mean TC level was found. However, lower mean TC level was in DM2 group, respectively, 3.70 mmol/L (SD=1.05) and 4.16 mmol/L (SD=1.13) in NDM2 group. (p<0.001).

Mean HDL level was normal both in DM2 – 1.04 mmol/L (SD=0.31) and in NDM2 group – 1.15 mmol/L (SD=0.34) (p<0.001).

Both DM2 and NDM2 groups had normal mean LDL level, respectively, 2.13 mmol/L (SD=0.92) in DM2 group and 2.63 mmol/L (SD=1.04) in NDM2 group (p<0.001).

Conclusion. Although TC, HDL and LDL mean levels were normal both in DM2 and NDM2 groups, lower levels were observed in AF patients with type 2 diabetes mellitus. However, mean TG level was normal in AF patients without type 2 diabetes mellitus and elevated in AF patients with type 2 diabetes mellitus.

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MUSIC-BASED DIGITAL INTERVENTIONS FOR PSYCHOSOCIAL OUTCOMES: A SCOPING REVIEW

Key words: digital intervention, internet-based intervention, mobile app, music, music therapy, psychosocial health care outcomes

Introduction. Over the last two decades, a steady increase in digital interventions for psychosocial outcomes has been observed in health care. Therapeutic use of music for psychosocial support of patients and clients indicates positive effects on various mental health conditions. Nevertheless, the effect of music-based interventions often remains equivocal due to uniqueness of interventions and lack of transparent reporting.

Aim. To explore the characteristics of music-based digital interventions for psychosocial outcomes.

Materials and methods. A scoping review of peer-reviewed scientific articles was conducted. Digital music therapy interventions and other digital music-based therapeutic interventions for adults were included. Thematic analysis was used to process the data.

Results. The search was conducted in four electronic databases (PubMed, Web of Sciences, ScienceDirect, EBSCO). 19 studies were included in the review. Different patients'/clients' samples (e.g., stroke patients, hypertension patients, job seekers, health care workers, etc.) and mental health conditions (depression, anxiety, distress, etc.) were intervened.

Conclusions. Although in most of studies no full set of components recommended for reporting music-based interventions was found, the research revealed that music-based digital interventions are widely and effectively used in health care.

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PERSISTENCE OF SYMPTOMS OF COVID-19 INFECTION AND THEIR DEPENDENCE ON VACCINATION STATUS AND THE PRESENCE OF CHRONIC DISEASES IN OUTPATIENT GENERAL PRACTITIONER PRACTICE IN LATVIA

Background. The aim of this study is to investigate the duration of symptoms of Covid-19 infection, correlation between number of symptoms, their duration and vaccination status, age, presence of chronic (cardiovascular, lung) diseases in outpatients; to determine whether smoking affects the duration of symptoms of Covid-19 infection in Latvia's population.

Materials and methods. Latvian patients (n=78) who were diagnosed with Covid-19 infection were randomly selected, interviewed about the duration of Covid-19 infection, their symptoms, general health, smoking habits, the presence of Covid-19 vaccination, and included in this cross-sectional study. We used descriptive analysis, Chi-Square, ANOVA and independent samples t-test methods for statistical assessment.

Results. From total number of patients (mean age 42.58 years) 42.31% of respondents have at least one chronic cardiopulmonary disease, 15.38% of respondents have two or more chronic diseases. Three patients (3.85%) after Covid-19 infection developed chronic illness, two of them were diagnosed with bronchial asthma and one with vestibular neuritis. 17.75% of patients had symptoms for less than one week. 11.54% of patients had symptoms for precisely one week. 37.18% had symptoms for more than one week but less than two weeks. 8.97% of patients had symptoms for more than two weeks but less than three weeks. 24.36% of patients had Covid-19 symptoms for more than three weeks.

Conclusion. This study provides evidence that the duration of symptoms in vaccinated patients is shorter than in unvaccinated patients. The data will help educate patients about the need for vaccination against Covid-19 infection, chronic disease control, regular medication use and smoking cessation.

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PREVALENCE OF DEPRESSION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS IN PRIMARY CARE

Key words: depression, diabetes mellitus, type 2, PHQ-9, general practitioners, primary health care

Background. Data from the International Diabetes Federation show that the incidence of diabetes is rising rapidly. Since 2000, 200 million new diabetics have been diagnosed worldwide. Data from the study "Prevalence of major depression and associated correlates in Latvian primary care population: results from the National Research Program BIOMEDICINE 2014–2017" show that the prevalence of depression in the general population of Latvia (7.9%) is higher than the average in other European countries (6.9%). Depression in diabetic patients is often associated with poor glycemic control, poor adherence to medication, increased diabetic complication, and higher risk of mortality.

The aim of this study was to evaluate the prevalence and severity of depression among patients with type 2 diabetes mellitus, their glycemic control, and compliance with complex treatment in general practice.

Methods. All patients were divided into two groups – patients with and without depression. For data collection PHQ-9 depression scale was used for the quantitative assessment of depression of the participants. Patient questionnaire data, laboratory and anthropometric data from patient medical records were used in the study. In the statistical evaluation of the data – T test, Mann-Whitney and Chi-squared test was used. Data was analysed using MS Excel and IBM SPSS.

Results. The study examined 73 patients with type 2 diabetes mellitus that consisted of 37 (50,7%) women and 36 (49,3%) men from two general practitioner practices in Riga. Respondents' average age was 65,84 years. Patients who had > 60 years were 75,4% (n= 55) and patients who had < 60 years were 24,6% (n= 18). In this study 31 patient (42,5%) had symptoms of depression: 24 mild depression symptoms, 5 moderate depression symptoms, 1 moderately severe depression symptoms and 1 severe depression symptoms. Results showed that depression score and high glycosylated hemoglobin, total cholesterol (TH) and low – density lipoproteins cholesterol (LDL) level in plasma was not statistically significant between both groups. P-value > 0,05 was not considered statistically significant. Analyzing non-pharmacological treatment compliance in both groups did not find statistical difference.

Conclusion. This study did not prove that patients with depression had worse glycemic control. Nevertheless, diabetes mellitus is very often associated with high prevalence of depression, so it is very important to early detect depression clinical symptoms and start treatment by general practitioners' doctors.

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PSYCHIC DISORDERS AFTER SARS-COV-2 INFECTION IN PRIMARY CARE PATIENTS

Introduction: SARS-Cov-2 infection is associated not only with somatic complications and exacerbations of chronic diseases, but also with various kinds of mental disorders including chronic fatigue, sleep disturbances and increased anxiety.

Aim: The aim of the study was to find out how contracted SARS-CoV-2 infection affects mental health.

Method: A retrospective quantitative study was conducted in the period from 01/05/2021 to 30/11/2021 in GP practice and online by surveying patients who had contracted SARS CoV-2 infection. Data was statistically analyzed using Microsoft Excel.

Results: The study included 155 patients with SARS CoV-2 infections aged 18 and over, 79% female and 21% male. A larger proportion of respondents 52% were from large cities, 37% from Riga and 11% from rural areas. Half of the respondents had higher education, 32% secondary vocational education, 13% secondary and 5% basic education. Of all the respondents, 44% suffered from SARS CoV-2 infection mild symptoms, 36% moderate, 14% severe and only 6% were asymptomatic. When answering the question whether they were afraid of SARS CoV-2 infection 64% noted that yes, 36% noted that no. Having received the positive response of the SARS-CoV-2 test, 57% did not bother, however, 29% had a great excitement, 8% had depression, 6% started to panic. Chronic fatigue after SARS-CoV-2 infection was observed in 55% of all the patients, sleep disturbances were noted in 66%, increased anxiety was noted in 69%, depressed mood and depressive episodes were observed in 71% of all the respondents.

Conclusion: From the study, it can be concluded that various types of mental disorders are very common in patients with SARS-CoV-2 infection, depressed mood and depressive episode are the most common, as well as increased anxiety.

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REDUCTION OF THE MUSCLE IMBALANCE FOR SOCCER PLAYERS BETWEEN FOUR-HEADED THIGH MUSCLE AND TWO-JOINT EXTENSOR WITH BIODEXSYSTEM ISOKINETIC DYNAMOMETRY AND POST-ISOMETRIC RELAXATION

Key words: *muscle imbalance, soccer players, trauma, post-isometric relaxation, BiodexSystem isokinetic dynamometry*

Introduction: One of the risk factors for injury in footballer is a lack of strength and flexibility, fatigue, or an imbalance of strength between agonist muscles and antagonist muscles. The use of Biodex equipment to reduce muscle imbalance.

The aim of the research: To explore the muscle functional state and effectiveness of the therapeutic gymnastic in reducing muscle imbalance between four-headed thigh muscle and two-joint extensor with BiodexSystem isokinetic dynamometry and post-isometric relaxation methods for soccer players.

Material and methods: The research was performed at the Laboratory of Rehabilitation Technology of the Rēzekne Academy of Technologies in 2019. Footballers of the indoor football club Rēzekne participated in the research. The research was conducted in three phases: functional evaluation of muscles, therapeutic gymnastic and re-evaluation of muscle function. 12 soccer players (16–22-year-old male). The following methods were used: straight-leg raise test, Ely's tests, dynamometry

(BiodexSystem (BSD)), physiotherapy methods (therapeutic exercises, stretching technique (PIR)) and statistical data processing.

Results: Prior to therapeutic exercise, athletes in the BSD group had a greater reduction in hamstring muscle length than in the PIR group. After therapeutic exercise, the results in the BSD group (average) improved by $17 \pm 1,40$ with a confidence factor ($p < 0.0001$) and the results in the PIR group improved significantly by $6,0 \pm 0,60$ with a confidence factor ($p = 0.013$), which is statistically significant.

Conclusion: The tests and methods selected for the functional examination and evaluation of footballers' muscles reflected significant changes in the muscle strength ratio of agonists and antagonists after the course of therapeutic exercise.

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SHIFT WORK AS A RISK FACTOR FOR METABOLIC SYNDROME

Key words: shift work, metabolic syndrome

Introduction. Due to the high workload and shift work of medical staff, development of metabolic syndrome is more likely than in other industries. Therefore, in my work I would like to survey respondents about their lifestyle, health checks, eating habits, as well as harmful habits that go along with shift work.

Materials and methods. In this study 220 respondents (87,7% women and 12,3% men) who work shift work participated in this questionnaire. Collected data was analysed by using IBM SPSS statistics.

Results. In this study participated; 46.8% of EM physicians' assistants (associates), 29.1% of physicians' assistants, 6.8% of resident doctors and 6.4% of certified doctors. 69.5% answered that they mostly work 24 h shifts and in one week it's more that 48 hours, 73.2% of them work directly in the Emergency medical service, 10.9% works in hospital and 8.2% works both.

85.5% of respondents answered that they don't have high blood pressure, 14.5% answered that they have high blood pressure ($>130/85$ mmHg).

55.0% answered that they don't have excess fat around the waist (>88 cm for woman, >102 cm for men) and 45.0% that they have excess fat around waist.

77.7% answered that they have normal glucose level and 5.5% have elevated glucose level, 16.8% haven't done such blood test.

47.7% answered that they don't have elevated LDL cholesterol and 16.6% have elevated LDL cholesterol.

49.5% answered that they don't have elevated HDL cholesterol and 13.2% have elevated HDL cholesterol, and 37.3% haven't done such blood test.

Conclusion. Despite the fact that 12.7% of respondents answered that they have diagnosed dyslipidemia and 87.3% don't, that is no reason to say that they have metabolic syndrome. Looking at the specialities, shift work and their blood test answers the shift work are not metabolic syndrome risk factor.

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SINGLE-NUCLEOTIDE POLYMORPHISMS: RS7041 AND RS4588, OF GC (VITAMIN D BINDING PROTEIN) GENE ASSOCIATION WITH BRONCHIAL ASTHMA IN LATVIANS

Background. Bronchial asthma (BA) is a chronic inflammatory, genetically complex, heterogeneous disease. Vitamin D is a nutrient and hormone that plays important role in the pathogenesis of various allergic diseases, such as asthma and food allergy. Vitamin D acts through binding to a specific Vitamin D Binding Protein (coding by GC gene) which is involved in vitamin D transport and storage. Genetic variants rs7041T/G and rs4588C/A of the GC gene have been studied as potential risk factors for vitamin D deficiency and were found to alter vitamin D metabolism (Ganz AB et al., 2018).

Aim. to identify the potential association of GC (rs7041 and rs4588) gene variations with bronchial asthma in Latvian children.

Methods. The case/control group: 148 children with and 253 individuals without bronchial asthma. The GC (rs7041 and rs4588) were genotyped by restriction enzyme site polymorphism on BA main and sex-specific association. Statistical analysis was done with SPSS.25 Statistical Package.

Results. In both BA and Latvian population cohorts, both SNPs genotyping call rate was 100%, and the markers were found to be in the HWE ($p > 0.05$). Statistical analysis revealed a significant association with BA for both CG loci studied (rs4588, $p < 0.01$ and rs7041, $p < 0.05$, respectively), for common alleles and for homozygotes involving common alleles. The heterozygote genotypes CA (rs4588) and GT (rs7041) and rare allele genotypes TT (rs7041) were found to be clinical protective factors in the BA cohort (OR = 0.53, CI 95% [0.35-0.80]), OR = 0.59, CI 95% [0.37-0.95] and OR = 0.49, CI 95% [0.31-0.77], respectively). A sex-specific protective nominal effect ($p < 0.01$) was found for the rare allele genotypes TT (rs7041) in affected women.

Conclusions. We present evidence that the GC (rs7041 and rs4588) may contribute to the risk of bronchial asthma in Latvian children, and thus plan to analyze the interaction of this polymorphism with the clinical characteristics of BA in future studies.

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STATISTIC SUMMARY OF TROMBECTOMY EFFICIENCY IN CASE OF CEREBRAL INFARCTION IN DAUGAVPILS REGIONAL HOSPITAL DEPENDING ON PATIENT AGE AND GENDER

Introduction. In Latvia, an average of 27 patients are diagnosed with a stroke daily, 7 of said patients die. A stroke is one of the leading causes of disability in the world. The possibilities of reducing the adverse consequences of cerebral infarction is a pressing medical issue.

Objective of the study, materials and methods. The objective of the study is to analyze the results of endovascular treatment results depending on the age and gender of the patients with acute ischaemic stroke treated at Daugavpils Regional Hospital from May of 2020 to December of 2021. During the

research, the medical records in Daugavpils Regional Hospital were analyzed from the following time period: May of 2020 to December of 2021. Patients were divided into several groups on the basis of gender and age (≤ 60 years; 61–70 years; 71–80 years; ≥ 81 years). The effectiveness of endovascular treatment was analyzed by the NIHSS scale difference at onset and at discharge, that value is Δ NIHSS. For the statistical processing of the data MS Office Excel was used.

Results. Medical records of 40 patients aged 41 to 91 were analyzed. 16 of which were women and 24 were men. The average age for women was $76,31 \pm 8,19$ years and the average age for men was $67,33 \pm 11,49$ years.

The average Δ NIHSS in the male patient group was $9,05 \pm 6,23$ and the average Δ NIHSS in the female patient group was $8,35 \pm 9,53$. No statistically significant difference in endovascular treatment outcomes was observed between the male and female patient groups.

The average Δ NIHSS in the patient group below the age of 60 was $10,4 \pm 8,20$, the average Δ NIHSS in the group aged 61 to 70 was $9,25 \pm 8,28$, for the group 71 to 80 years of age, the average Δ NIHSS is $8,66 \pm 9,69$, for the age group above 81 years, the average Δ NIHSS was $7,75 \pm 4,46$. There was no statistically significant difference in endovascular treatment outcomes in the different patient age groups.

Conclusions. Endovascular treatment is an effective method for treating acute cerebral infarction that significantly reduces the focal neurological symptomatology and improves the functional state of patients. In this study, no statistically significant patterns associated with a small number of patients were observed. The study should be conducted further.

NIHSS scale difference at onset and at discharge = Δ NIHSS.

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TENSION AND ACTIVITY IN NECK EXTENSOR MUSCLES DEPENDING ON THE HEAD POSITION WORKING ON COMPUTER

Key words: muscle, neck extensors, tension, computer monitor

Introduction. In recent years, the need to use a computer in daily life has been increasing rapidly, especially since the start of the COVID-19 infection pandemic in 2019. To continue studies and work, people were forced to use the internet and, consequently, computers daily. As time spent in front of computer monitors increases, so does the incidence of musculoskeletal health problems – neck muscle pain being only one of them. Too much tension in neck muscles can also cause head and neck pain, dizziness, and fatigue. The wrong positioning of the screen might be related to these complaints in employees and computer users.

Aim. The study aims to determine how the position of the head relative to the computer monitor affects the tension of the neck extensor muscles.

Material and Methods. A quantitative cross-sectional study of neck extensor muscle tension was performed in healthy participants regularly working on computer ($n=19$, of them 6 males and 13 females, mean age 35 years). To ensure accuracy of myotonometric measurements, initially all study participants were tested for physiologic extensor muscle strength. Measurements of the neck extensor muscle (m.semispinalis capitis and m. splenius capitis) tension, decrement, stiffness, and relaxation were obtained bilaterally by MyotonPro 5.0.0 in the sitting position. The change of head position occurred in the sagittal plane and was obtained by measuring the craniovertebral angle with a goniometer. Data were analyzed by IBM SPSS Statistics version 23 using Spearman's test with $p < 0.05$ considered statistically significant.

Results. Results showed statistically significant differences: for m. semispinalis capitis, there was a positive correlation between angle and oscillation frequency $r=0.286$ ($p < 0.001$), angle and stiffness $r=0.268$ ($p < 0.001$), but a negative correlation between angle and relaxation $r=-0.344$ ($p < 0.001$). There was

no significant correlation between angle and decrement. The highest oscillation frequency value was at the angle of +30 degrees - 19.79 ± 2.76 Hz, the lowest at neutral position - 17.9 ± 2.66 Hz. The highest decrement was at neutral position 1.35 ± 0.17 , the lowest - at +30 degrees (1.31 ± 0.16). For m. splenius capitis, there was a positive correlation between angle and oscillation frequency $r=0.298$ ($p<0.001$), angle and stiffness $r=0.271$ ($p<0.001$), but a negative correlation between angle and relaxation $r=-0.375$ ($p<0.001$). The highest oscillation frequency value was at the angle of +30 degrees - 17.83 ± 1.94 Hz, the lowest at neutral position - 16.39 ± 1.73 Hz. The highest decrement was at the neutral position 1.21 ± 0.23 , the lowest at +30 degrees - 1.15 ± 0.17 .

Conclusion. The maximal muscle tension was at +30° angle, whereas the minimal - at neutral head angle, which corresponds with neck extensor muscle physiology and biomechanics. Thus, neutral head position would be recommended to reduce neck muscle overload while looking at the screen.

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THE COURSE OF COVID 19 INFECTION IN PATIENTS WITH CHRONIC AND WITHOUT CHRONIC DISEASES IN A GP PRACTICE

Introduction: SARS-CoV-2 is a viral infection that spreads very rapidly through airborne droplets and is very dangerous for patients with chronic somatic diseases.

Aim: The aim of the study is to clarify how the presence of chronic diseases affects the course of SARS-CoV-2 disease in patients with chronic diseases and without them.

Method: a retrospective quantitative study was conducted in the period from 01/05/2021 to 30/11/2021 in GP practices and online by surveying patients who had COVID-19 infection. All respondents were divided into 2 groups: with chronic somatic diseases and without chronic somatic diseases. The data were statistically analyzed using Microsoft Excel and Jamovi 2.2.5 software.

Results: In this study, 155 patients from age 18 were included. Among 155 patients, 87 patients were with chronic diseases and 68 patients without chronic diseases. A higher incidence of chronic disease was respiratory in 26 patients (27%), cardiovascular disease in 26 patients (27%) and endocrine disease in 22 patients (22%). There is a statistically significant difference in the duration of illness between the patients without chronic diseases and the patients with chronic diseases, $U = 873$, $p < 0.001$, $r = 0.707$. The average duration of the disease in patients without chronic diseases was up to 1 week, while in patients with chronic diseases up to 3–4 weeks. The patients without chronic disease suffered from a predominance of COVID without symptoms or mild symptoms, while patients with chronic disease suffered from moderate or severe, which is statistically significant, $U = 581$, $p < 0.001$, $r = 0.805$. Exacerbation of chronic diseases after COVID-19 infection was observed in 23 people (27%), more frequent exacerbations of diseases were respiratory in 14 people (61%).

Conclusions: Statistically data show that patients with chronic diseases suffer both more severely and longer from COVID-19 infection. The patients with chronic respiratory illness are at particular risk, as this often worsens with COVID 19 infection.

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THE DIGITALIZED BALANCE ASSESSMENT AS A FOUNDATION OF THE COORDINATIVE TRAINING IN CEREBELLAR ATAXIA (A POST-COVID-19 CLINICAL CASE)

Corona-virus disease 2019 (COVID-19), caused by the newly emerged coronavirus [severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)], affected the public health in the world. Many acute and chronic neurological issues were considered as consequences of COVID-19: ischaemic stroke, inflammatory and neurodegenerative disorders (encephalomyelitis, leucoencephalitis, Guillain-Barre syndrome and chronic demyelinating polyneuropathy, relapses of Multiple sclerosis, Parkinsonism; cognitive impairment, post-intensive care syndrome (PICS), Memory, attention and sleep problems; Brain fog, Post-traumatic stress syndrome, Depression and Anxiety.

Cerebellar degeneration and subsequent cerebellar ataxia (CA) include a group of disorders, affecting coordination, balance and speech. The outlook for ataxia vary considerably, but most adult onset ataxias will get progressively worse over many years. A multidisciplinary approach is necessary in CA.

We present a case of a woman of 51 years, with CA, developed progressively for a period of 7-8 months; the onset was 25 days after a Corona-virus disease (fever up to 38°C, headache, fatigue, myalgia and arthralgia, without pneumonia). At the entry in our department, she presented vertigo, balance and gait instability, dysmetria and dysdyadochokinesia, muscular cramps in both legs, ataxic dysarthria. During the TYMO Balance test (TyroMotion system), we obtained oscillations of the center of pressure and extended sway area, with considerable anterior-posterior displacement. The instability increases on instable surface and after eyes' closure. Romberg index 0.74.

Many studies provide Class III evidence that coordinative training improves motor performance and reduces ataxia symptoms in patients with progressive CA.

The detailed digitalized evaluation of the equilibrium was the base for structuration of a complex training of the balance, gait and coordination, adapted to the needs to the concrete patient.

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THE RELATIONSHIP BETWEEN CIGARETTE SMOKING AND THE RISK OF ENDOMETRIAL HYPERPLASIA IN BREAST CANCER PATIENTS TREATED WITH TAMOXIFEN

Key words: breast cancer, tamoxifen, endometrial hyperplasia, endometrial cancer, smoking

Background: Endometrial hyperplasia and endometrial carcinoma share a few risk factors as cigarette smoking, particularly in combination with tamoxifen usage.

Aim: This study was to examine relationship between cigarette smoking and endometrial pathology in breast cancer patients.

Material and Methods: This study analysed medical records of 123 women who received tamoxifen for breast cancer. Clinical characteristics were compared retrospectively between women with endometrial pathology (endometrial hyperplasia or cancer) and those with normal histology or endometrial polyps, myomas. Associations were calculated with Chi-Square test.

Results: Among 123 patients, endometrial hyperplasia was diagnosed in 42 women. Endometrial cancer was diagnosed in 4 patients. Endometrial polyps were found in 8 women, endometrial myomas were found in 18 women. 51 women presented with normal endometrium. Out of 123 women, 22 were diagnosed with endometrial hyperplasia and were smokers. There was a statistically significant association ($p < 0.001$) between smoking and development of endometrial hyperplasia during tamoxifen use. When comparing women with endometrial hyperplasia ($n=42$) to women without endometrial hyperplasia ($n=81$), cigarette smoking increased relative risk by 3,911 times (95%CI; 2,546-6,009) of developing endometrial hyperplasia. When comparing women with endometrial polyps, myoma and cancer to cigarette smoking no significant association was found.

Conclusion: Smoking increases risk of endometrial hyperplasia in patients with breast cancer who used tamoxifen. The association between endometrial polyps, myomas and endometrial cancer with cigarette smoking was not found.

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UNIVERSITY STUDENTS STUDY SATISFICATION AND PERSONALITY TRAITS (EXTRAVERSION AND NEUROTICISM)

Key words: students, study satisfication, personality traits, extraversion, neuroticism

Introduction. There are studies that measure university students satisfication with their studies but isn't enough information about what influences their study satisfication, for example, personality traits.

Aim of the study. This study aims to measure the causation between study satisfication among university students and their extraversion and neuroticism and their chosen study area.

Materials and methods. We asked multiple universities in Latvia to give students to fill a questionnaire electronically, voluntarily. We received 900 valid responses. The questionnaire consists of demographic data, The Big Five Inventory to measure personality traits (extraversion and neuroticism) and Global Study Satisfication.

Results. There is very high statistical signigance (p -value < 0.001) between Global Study Satisfaction and extraversion and neuroticism. Neuroticism is with a negative sign, meaning that students with higher neuroticism are less satisfied with studies. Similarly, more extravert students are more satisfied with their studies. The satisfaction with the studies increases with the student age but decreases with the number of years studied (p -value < 0.001).

There are few statistically significant differences in the study satisfaction and study areas: arts and social science students are more satisfied with their studies than humanity program students (p -value < 0.05).

Conclusions. The study data suggests that neuroticism and extraversion influences student study satisfication. Arts and social science students are the most satisfied with their studies.

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USE OF THE TRANEXAMIC ACID AT THE PREHOSPITAL STAGE OF SUSPECTED INTERNAL, UNSTOPPABLE BLEEDING

Key words: *tranexamic acid (TxA), hemorrhagic shock, polytrauma, emergency medical treatment, cardiopulmonary resuscitation*

Medicinal product tranexamic acid was added to the equipment of the Emergency Medical Service Brigades in Latvia in July 2020. TxA is indicated for patients following high energy trauma, polytrauma and other suspected internal, unstoppable bleeding or development of hemorrhagic shock. Shock is a pathological condition where organ perfusion is not relevant to the metabolic needs of tissues, resulting in anaerobic metabolism. If this condition is prolonged, organ failure and the death of the body occur. The aim of the study is to clarify the treatment tactics selected by the Emergency Medical Service team leaders and the frequency of TxA use in patients suspected of internal, unstoppable bleeding. A retrospective study analyzed 93 electronic call cards during the period from 1 January 2020 to 31 December 2020.

In the prehospital phase of TxA, suspected internal, unstoppable bleeding was administered in 2020 to 78 patients. The most common age group was 55 to 59 years of age, or 13 patients. Of all 78 patients, women 28 (35.90%) were nearly twice less than men 50 (64.10%). Of the 78 patients, 30% were given a diagnosis of hemorrhagic shock. Out of all calls, there were 35 polytraumas patients or 44.87%, demonstrating that one of the most frequent indications of TxA is high-energy trauma. It should be noted that 14 calls required an additional emergency team to provide the patient with medical care. TxA was also used in 9 (12%) calls where the diagnosis was associated with gastrointestinal bleeding in patients. Of the 78 patients, 5 had heart stops and failed resuscitation in two cases.

Conclusion: Administration of TxA is indicated more frequently in polytraumatic patients at prehospital stage, as trauma is one of the most common reasons for developing internal, unstoppable bleeding and requires additional attraction of medical care resources.

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USE OF VIRTUAL REALITY IN ADOLESCENCE AND YOUNG ADULT PSYCHOTHERAPY

Introduction. Virtual reality technologies are rapidly evolving around the world. Their use is increasing in different sectors, including medicine and mental health. In psychotherapy, the use of virtual reality for therapeutic purposes has been studied and also integrated into everyday practice, but there are no data on the use of psychodiagnostic interventions.

Objectives. The aim of this study was to compare the results of the psychodiagnostic test obtained in virtual reality with those obtained on site.

Materials and methods. A test stress measurement study was carried out between September 2021 and December 2021 in the Virtual Therapy Laboratory, announcing the selection of volunteer respondents, defining the age of the respondent from 11 to 25 years as a criterion. A "Home - Tree - Person" personality-drawing test was used, which was performed twice by respondents: in virtual reality and then on site. The resulting data was analyzed with Mirosolft Excel and SPSS programs.

Results. 10 volunteer adolescents and young people applied for the study, of which 4 female and 6 male. For the object "house", the coincidence percentage, evaluating all 10 criteria, ranged from 20% to 100%. The coincidence level ranged from poor (kappa coefficient £0) to near ideal (kappa coefficient 0.81-1). Statistically significant coincidence were obtained in only one criterion - "window availability" (p = 0.002). For 4 criteria, a situation is observed when there is not enough data in the virtual reality and on site categories from which to calculate kappa and p values. The percentage of

coincidence for the “tree” object in the evaluation of all 9 criteria ranged from 50% to 90%. The level of coincidence is assessed as light (kappa value factor 0.1-2.0) in 2 criteria, fair (kappa value factor 0.21-0.40) in 3 criteria, moderate in 1 criterion (kappa value factor 0.41-0.60) and significant in 2 criteria (kappa value factor 0.61-0.80), where there are statistically significant data ($p = 0.010$). 1 criterion does not provide sufficient data to calculate kappa and p values. The coincidence percentage for the “human” object ranged from 20% to 90% when evaluating the 11 criteria. The level of coincidence is poor (kappa value factor £0) in 5 criteria, moderate (kappa value factor 0.41-0.60) in 3 criteria, of which “detail” is statistically significant ($p = 0.05$). 1 criterion has a significant level of coincidence (kappa value factor 0.61-0.80) and statistically significant data ($p = 0.011$). 2 criteria do not have sufficient data to calculate kappa and p values.

Conclusions. The results of the research show that the results of the psychodiagnostic “House - tree - person” personality test in virtual reality differ from those obtained in person and the use of psychodiagnostic interventions in virtual reality is not similar to the use of psychodiagnostic interventions on site.

VĒSTURE UN KULTŪRAS VĒSTURE

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HISTORY AND HISTORY OF CULTURE

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HISTORICAL FORMATION AND DEVELOPMENT OF SOCIETY HOUSES IN THE FIRST PERIOD OF LATVIAN STATEHOOD

Key words: society houses, cultural institutions, amateur arts

Introduction. This article will analyse the historical formation and development of society houses from the second half of the 19th century until the last years of the first period of Latvian statehood in the end of 1930s. During this time, throughout Latvia various associations were very active, founding choirs, orchestras, theaters and organizing social, educational and artistic events. Starting from the 1860s, the associations raised funds to build their own houses in which to meet and organise their activities. Society houses were founded on the initiative of national intelligentsia, trade unions, entrepreneurs and ordinary people all over Latvia, with the aim to provide space for social, educational and cultural activities, for common festivities and leisure time of the local communities in villages and towns. By offering possibilities and space for self-expression and feeling of togetherness of ordinary people, society houses were part of the national awakening and emergence of Latvian nation-building. During the first period of Latvian statehood society houses provided access to culture in all regions of Latvia, be it in cities or villages. Society houses also played an important role in ensuring the Latvian Nationwide Song Celebration in Latvia.

Aim of the study. Within the framework of this research, the author analyse the historical formation and development of society houses in Latvia and their role in the development of Latvian national culture.

Materials and Methods. Comparative analysis of scientific literature, official reports and documents of government agencies and municipalities, as well as secondary data analysis and analysis of archive material.

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LATVIJAS SARKANĀ KRUSTA ŽĒLSIRDĪGO MĀSU SKOLA RĪGĀ (1920–1940)

1918. gada 20. novembrī tika dibināta Latvijas Sarkanā Krusta biedrība (LSK). 1920. gada 21. septembrī tika izveidoti *Latvijas Sarkanā Krusta Žēlsirdīgo māsu kursi*, kas atradās pie LSK ķirurģiskās slimnīcas Rīgā. Mācības tika uzsākas 1921. gada 1. janvārī. Mācību ilgums bija divi gadi. Par iestādes direktoru kļuva dr. Aleksandrs Neibergs (1883–1962) un par vecāko māsu iecēla žēlsirdīgā māsu Martu Celmiņu (1881–1937), bet no 1922. gada par vecāko māsu kļuva žēlsirdīgā māsa Marija Rumševice (1878–1962). Kursos tika uzņemtas pilsones ar 6. klasu izglītību un nevainojamu veselību. LSK žēlsirdīgo māsu kursu mērķis bija sagatavot slimo kopšanai un veselības aizsargāšanai spējīgas, teorētiski un praktiski labi izglītotas māsas. Kursantu vecums varēja būt no 18 līdz 30 gadus vecām. Kursu audzēknēm bija jādzīvo pie kursiem, kur saņēma brīvu uzturu, apgaismošanu, apkurināšanu un apmazgāšanu. Kursu programmā bija teorētiskie priekšlasījumi un praktiskais darbs slimnīcās.

1927. gadā tika izveidota *Latvijas Sarkanā Krusta žēlsirdīgo māsu skola* ar divgadīgo mācību programmu. Mācību programma pamatā nemainījās. Kursantes strādāja un praktizējās Latvijas Universitātes klīnikās un LSK veselības kopšanas punktā. 1928. gadā tika uzbūvēta jaunā ēka māsām un tā paša

gada rudenī sāka uzņemt audzēknes ik gadu. 1930. gadā tika izdota Latvijas Žēlsirdīgo māsu skolas minimālā programma, kas pilnībā atbilda jau iepriekš pieņemtajām.

1933. gadā Žēlsirdīgo māsu skolā tika ieviesta trīsgadīgā māsu programma. 1939. gadā no LSK Rīgas slimnīcas virsmāsas amata un skolas vecākās māsas amata pensijā aizgāja Marija Rumševica. Viņas vietā tika iecelta žēlsirdīgā māsa Elza Nulle-Siecenieks (1895–1977), bet par māsu audzinātāju (instruktīve) māsa Dagmāra Kretulniece. 1939. gadā no jauna tika izdota LSK Žēlsirdīgo māsu skolas uzņemšanas noteikumi un programma, kura pilnībā atbilda jau 1930. gada izdotajai un apstiprinātajai programmai. LSK māsu skolu Rīgā no 1923. līdz 1939. gadam pabeidza 368 žēlsirdīgās māsas.

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PIRMAIS PASAULES KARŠ JAUNĀKĀS LATVIEŠU RAKSTNIEKU PAAUDZES (1880–1895) DZĪVĒ UN DARBOS

Jaunākā rakstnieku paaudze izcēlās ar visaugstāko ambiciozitāti starp literātiem kara laikā. No viņu sacerējumiem un preses izriet, ka šiem sabiedriskajiem darbiniekiem bija nepieciešamība izcelties sabiedrībā dažādu, arī politisku, mērķu sasniegšanai – gan reālajā laikā, gan arī nākotnē. Īpaši vērojams šīs aktivitātes pacēlums pēc politiskajām jukām kara pēdējos divos gados, pēc padomju varas uzstādīšanas 1917. gada beigās. Nebija retums arī šīs paaudzes rakstniekiem stāties strēlniekos kā arī dažādās humanitārās palīdzības organizācijās.

Kārlis Skalbe, izmantodams mākslinieciskās izteiksmes līdzekļus, savās „Kara gleznās” diezgan skaidri un konkrēti parāda kara realitāti, kas bija pretstatā tā laika uzskatiem. Tēlojumi arī attēlo ierindas cilvēku un kā karš to pārveido. Nenovērtējamu ieguldījumu kara realitātes attēlošanā devis arī rakstnieks Kārlis Štrāls ar sarakstīto romānu „Karš”, kur attieksme pret karu attiecīgi parādīta kolektīvā un individuālā mērogā. Kopumā, Pirmais pasaules karš šajos darbos tiek parādīts kā bezjēdzīgs, bezcerīgs un cilvēka iekšieni graužošs. Turklāt šie darbi ir piemiņas vērti tamdēļ, ka tie ir vistuvāk realitātei, jo abi šie cilvēki bija latviešu strēlnieku rindās un pieredzēja to. Abi literāti savos darbos raksta par sabiedrības attieksmi pret mobilizāciju, tā bija pārsvarā negatīva. Tomēr kara sākumā diezgan aktuāla bija brīvprātīgā iestāšanās un karošana, ko var skaidrot ar Eiropas mērogā pacelto sajūsmu par ātro uzvaru karā kā arī dažādiem sabiedrībā pastāvošiem aizspriedumiem. Tāpat, stāšanās brīvprātīgo strēlnieku vienībās izvērsās un arī kļuva par patriotisma izpausmi ar ko izrādīja uzticību un lojalitāti cara patvaldībai.

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PUBLIC DISCOURSE OF HERBERTS CUKURS IN LATVIA

The paper “Public Discourse of Herberts Cukurs in Latvia” aims to unfold how Herberts Cukurs is discursively constructed in Latvian popular culture texts. Discourse historical approach is used as a method to reveal the Discursive constructions of Herberts Cukurs in Latvian popular culture texts. The paper concludes that discursive constructions of Herberts Cukurs in Latvian popular culture texts are positive. The question of his involvement in the Holocaust crimes is by large avoided.

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**STASYS DABUSIS: IF I EVER IN MY ARTICLES TOUCH
“OLD FORTRESS OF LANGUAGE” IT’S ONLY TO FIND
A STRONGER FOUNDATION FOR OUR LANGUAGE ...**

STASYS DABUSIS: If I ever in my articles touch “old fortress of language” it’s only to find a stronger foundation for our language ... The report presents one of the most prominent linguists of the 1st Independent Lithuania – Stasys Dabasis (1898–1974). S. Dabasis is a translator, one of the first practitioners and stylists of pre-war Lithuanian linguists, whose works are visible in the activities of all the most important institutions of Independent Lithuania that fostered the Lithuanian language. The focus is on his biographical data and traces of activity, which best reveal the scattered pages of the pre-war press. Until now, personal photographs of the linguist, stored in the personal archives of his distant relatives, have been published.

TIESĪBU ZINĀTNE

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HISTORICAL DEVELOPMENT OF THE NOTION OF EPIDEMIOLOGICAL SAFETY

Regardless of the development of society, the spread of infectious diseases still remains relevant. On the one hand, up to now, society has been relatively successful at fighting the spread of infectious diseases. On the other hand, however, new preconditions for the spread of infectious diseases continue to appear, calling for continuous attention to the matters of epidemiological safety.

Analysis of the historical development of the notion of epidemiological safety shows that elaborations of this notion are found in every historical period in accordance to the specific nature of each period. Moreover, patterns are found throughout the overall development process of the notion of epidemiological safety which form a specific development curve.

The conclusions offered allow predicting the possible future development trend of the notion of epidemiological safety and its basic principles.

The research aim is to analyse the historical development of the notion of epidemiological safety, evaluate its principles and patterns, and offer a possible model of the future development of the notion of epidemiological safety. The following most significant methods were used in the study: the analytical, historical, systemic, and teleological methods.

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PREPARATION OF CONVICTS FOR RELEASE

Since the birth of mankind, there has been good and evil, certain procedures, criteria and laws how to recognize evil and punish the offender. One of the forms of punishment that has existed for hundreds of years is the isolation of the offender from society, or in other words imprisonment. Deprivation of liberty (imprisonment) is temporary isolation imposed by a court judgment. This means that a person will return to society after the term of the sentence set in the court judgment.

The most important purpose of the sentence is to ensure the re-socialization of a person and legal behavior after the execution of the sentence. A convict is prepared for release and reintegration into society by helping to identify the causes of criminal activity (thinking errors, behavioral problems, addiction problems, including the use of intoxicants, etc.) to learn new patterns of behavior, to start compensating a victim, etc.

The author offers to look at the preparation of convicts for release as a separate means of resocialisation (measures) in the process of reintegration of convicts and in the context of inter-institutional cooperation.

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PRESERVATION OF PAPILLAE PATTERN PRINTS AT CONSTANT REDUCED TEMPERATURE

The aim of the experiment was to find out the possibilities of preservation of latent papillae pattern prints on plastic and glass objects when exposed to a constant reduced temperature from 24 to 240 hours.

Ten papillae pattern prints were placed on each of the ten plastic and ten glass objects, imitating the mechanism forming the grip and pressure prints and traces. After placing the papillae pattern prints on the objects, they were placed in a freezer with a constant temperature of -18°C.

A protocol was drawn up for each object, in which the following were recorded:

- initial data of the experiment (room temperature which the latent papillae pattern prints were placed on the object at, date and time);
- data recorded during the experiment (condition of the surface of the object after its removal from the freezer, drying time of the surface of the object, adhesion agents used for visualization of latent papillae pattern prints);
- results of the experiment.

During the experiment, the effect of time range on the preservation of latent papillae pattern prints at a constant reduced temperature was studied, as well as the effect of temperature change on the preservation of latent papillae pattern prints after removal of objects from the freezer and placing them at room temperature was studied and analyzed too.

In the course of the experiment, it was confirmed that after exposure to a constant reduced temperature papillae pattern prints valid for person identification can be detected after 24 h, 48 h, 72 h, 96 h, 120 h, 144 h, 168 h, 192 h, 216 h and 240 h.

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PROGRESSIVE PENITENTIARY EXECUTION OF LIFE-TERM PRISONERS IN LATVIA

Section 61, paragraph 3, point 4 of the Criminal Law defines a period (of 25 years) during which life-term prisoners may apply for an early release on parole (hereinafter – ERP) if they comply with the conditions referred to Section 50.³, Paragraph 4 of the Latvian Penitentiary Execution Codex. In Latvia, several life-term prisoners have applied for the ERP, but so far the court has not released any of them.

If life-term prisoners are eligible for ERP, then their behaviour during the sentence was assessed positively. An important question that needs to be answered by both the prison administration and the court is: "Did re-socialization measures applied to life-term prisoners and their further progress within the framework of progressive penitentiary execution help to reduce the risk of recidivism?"

The author of the scientific paper offers an opportunity to get acquainted with the peculiarities of the progressive penitentiary execution of life-term prisoners in Latvia. The problems that are identified in the scientific paper and their possible solutions can improve the execution of a custodial sentence in Latvia.

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RECIDĪVĀ NOZIEDZĪBA: KRIMINOLOĢISKĀS PROBLĒMAS

Recidīvā noziedzība ir viens no bīstamākajiem noziedzības veidiem, kas nelabvēlīgi ietekmē sabiedrības drošības pakāpi. Jēdziens recidīvs (latīņu val. *recidivus* – atgriešanās). Ar recidīvo noziedzību kriminoloģiskajā aspektā saprot krimināli sodāmu darbību kopumu, ko veikuši personas, kurām agrāk jau piemērots kriminālsods neatkarīgi no tā, vai sods par iepriekšējām sodāmībām dzēsts vai noņemts, kā arī to personu noziedzīgos nodarījumus, kuriem kriminālsods dažādu apstākļu dēļ nav piespriests [Kriminoloģija, 2004, 395].

Pētījuma mērķis ir, balstoties uz speciālās literatūras, prakses materiāliem un pētījumiem, raksturot recidīvās noziedzības kriminoloģisko raksturojumu un iezīmēt novēršanas virzienus.

Dažādi pētījuma dati apstiprina, ka gandrīz 30% agrāk notiesāto personu pirmo noziedzīgo nodarījumu izdarījušas, būdamas nepilngadīgas. Turklāt vērojama negatīva tendence, ka pirms 18 gadu vecuma sasniegšanas pirmo noziedzīgo nodarījumu izdarījusi puse notiesāti, kuras atzītas par recidīvistu. Īpašā recidīva bīstamība ir tajā, ka atkārtoti noziedzīgi nodarījumi kļūst jau par dzīves veidu. Nozīmīga recidīvistu daļa transformējas profesionālā noziedzībā, tā savukārt organizētā noziedzībā.

Recidīva rašanās pamats ir arī personības tikumiskās veidošanās negatīvi apstākļi, apkārtējās vides negatīva ietekme. Kriminoloģiskie pētījumi apliecina, ka recidīvistiem pavājinās ģimenes saites. Turklāt recidīvistu grupām ir raksturīga izteikta stabilitāte, ilgstoša noziedzīga darbība. Tas arī norāda, ka šai noziedznieku grupai plaši jāpiemēro speciālie preventīvie līdzekļi.

MENEDŽMENTS

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MANAGEMENT

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AUGSTĀKĀS IZGLĪTĪBAS LOMA GLOBĀLĀS TALANTU KONKURĒTSPĒJAS UN IZAUGSMES VEIDOŠANĀ

Analizējot augstākās izglītības lomu globālās talantu konkurētspējas un izaugsmes veidošanā mūsdienu pasaulē. Izvēlētie augstākās izglītības rādītāji, kas raksturo talantu un izaugsmes attīstību vismaz 117 valstīs, tika analizēti, izmantojot R programmatūru. Globālais talantu konkurētspējas indekss (GTCI) tika izmantots, lai empīriski novērtētu pasaules valstu talantu konkurētspēju. Lai novērtētu talantu izaugsmi, autori izmantoja GTCI vidējās gada izmaiņas iepriekšējo 5 gadu laikā. Rezultāts parādīja, ka augstākajai izglītībai ir būtiska nozīme talantu konkurētspējas un talantu izaugsmes veidošanā. Talantu konkurētspēju veicina izglītības kvalitāte un ilgums (absolventu prasmju kopums un vidējie mācību gadi), pētniecība un sadarbības inovācijas (zinātniskas publikācijas un starptautiski kopizgudrojumi) un digitālo tehnoloģiju izmantošana. No otras puses, talantu izaugsmi veicina izglītības kvalitāte (absolventu prasmju kopums un kritiskā domāšana mācību darbā), digitālo tehnoloģiju izmantošana un progresīvas digitālās prasmes. Šajā pētījumā iegūtie rezultāti var kalpot kā globāls etalons nākotnes politikai augstākās izglītības jomā un kā atsauce valstīm, lai turpinātu uzlabot savu talantu konkurētspēju un izaugsmi.

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DISASTER COMMUNICATION: STRATEGIES AND CHALLENGES OF DAVAO CITY

Disaster communication is an important and emerging key priority area among local governments. The purpose of this study was to determine the communication policies and plans used by the local government units of Davao City tasked in disaster risk reduction and management, and the communication strategies and challenges employed and encountered by these agencies in times of natural disasters. This study made use of a descriptive-qualitative design with multiple case study as the research design.

The target participants of the study were the head and staff of the agencies tasked in the disaster risk reduction and management in the city. To represent the regional level of agencies involved in disaster management, the researcher chose the Office of Civil Defense Region XI and Department of Social Welfare and Development Region XI; while the City Information Office, City Disaster Risk Reduction and Management Office and Barangay Disaster Risk Reduction and Management Office represented the local level.

Using key informant interview (KII), the participants revealed that they come up with Disaster Risk Reduction and Management (DRRM) Plan in creating and implementing programs regarding disaster mitigation, response and recovery.

Among the disaster communication strategies employed in the city are: *presence of city's own disaster radio; use of technology for information dissemination and knowledge management; ensured information relay down to grassroots level; pre-disaster education programs; and strong inter-agency and public-private coordination.* Meanwhile, *communication infrastructure and proliferation of fake news* are the identified

challenges. Lastly, the participants expressed that an *upgrade on technology, proper coordination of private groups with LGUs in relief efforts, continued conduct of localized trainings, and prioritizing disaster communication* are what local governments must put emphasis on to improve their disaster communication practices.

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IMPACT OF MANAGEMENT STYLE ON CHANGE MANAGEMENT EXCELLENCE IN COMPANY "X"

Key words: EFQM excellence model, business, organization management, management model, change management, excellence

With the number of food companies constantly increasing, under the conditions of tension and competition it is important to identify the company's strengths and weaknesses. Guaranteeing the sustainability of an organization requires a stable and excellent business environment that would remain excellent even in times of change. According to mission and vision of the organization under research, which are in line with the motives of business excellence, it is important to explore and update issues of business and change excellence. The results of the self-assessment obtained from the research will provide the organization with a basis for obtaining the EFQM Business Excellence Award. The Business Excellence Award, as the first in the food industry in Latvia, could increase partners' interest in the organization under research and improve its position in the market and in relation to competitors.

Research goal: To study the excellence of the change and business management process in organization "X" according to the European Foundation for Quality Management Excellence model.

Research methods: Theoretical methods: analysis of literature and normative documents related to the research problem; empirical methods: interview, survey; statistical methods of data processing: descriptive statistics; SWOT analysis.

Looking at the information available in the database of the Central Statistical Bureau from 2013 to 2018, it has been established that the number of economically active food enterprises has increased from 881 to 1,080, which testifies to the fact that the number of food enterprises has grown. In total, the number of producers of products such as bread, freshly baked pastry and cakes has risen from 240 to 310 in five years. EFQM's official website provides information about companies that have won business excellence awards. Unfortunately, at the moment, none of the food and beverage producing companies in Latvia has received this award. The only EFQM Excellence Award in Latvia has been received by the education institution RISEBA. The results of the study show the following performance for the organization "X": by the EFQM excellence model, the business excellence level of organization "X" is 750 points out of 1000 according to the current level, and the level of change management excellence for the organization "X" is 3.7 points out of 5 points according to the current level.

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IMPLEMENTATION OF THE SELF-GOVERNMENT STRATEGY FOR SPORTS MANAGEMENT OFFICIALS TO REDUCE THE PROFESSIONAL BURNS SYNDROME

Key words: burnout syndrome, occupational disease, stress

Each of us has heard the phrase: "Burned out at work". Until recently, they all perceived these words as a beautiful metaphor. However, studies carried out over the last ten years have shown the existence of this phenomenon, called "burnout syndrome".

Burnout syndrome is a condition of emotional and / or physical fatigue, exhaustion, which is a consequence of long-term emotional well-being associated with a person's self-image and working conditions. The onset of exhaustion may be gradual or sudden.

Burnout syndrome is often seen in a variety of occupations that are at high risk of stress in the workplace. Such professions may include those involving the provision of assistance or support to other people. Professions that involve intensive communication with the client. People with a conflict of values, unmet emotional needs, who do not know how to solve their problems constructively and use the "escape" mechanism at work, in personal life, in relationships (addictions, including workaholicism), with an external control focus are at greater risk of burnout. (Maslach C., Schaufeli W.B., Leiter M.P. (2001). Job Burnout, *Annual Review of Psychology*, Vol. 52).

Burnout syndrome is the most dangerous occupational disease for those who work with people: teachers, social workers, psychologists, managers, doctors, journalists, businessmen and politicians – all of whom cannot do without communication. Professional burning is a syndrome that develops against a background of chronic stress and leads to the loss of the emotional, energy and personal resources of a working person.

The aim of the research is to analyze the causes of burnout syndrome of "X" city sports department officials and to propose a solution to reduce it.

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KARAVĪRA PAŠPILNVEIDE NACIONĀLAJOS BRUŅOTAJOS SPĒKOS

Atslēgvārdi: *Latvijas Nacionālie Bruņotie spēki, NBS vienība, LNBS karavīri, karavīru pašizaugsme*

Piedāvātajā pētījumā ir izanalizēta karavīru pašizaugsmes un pilnveides iespējas šajā sarežģītajā pārmaiņu laikā. Latvijas Nacionālie bruņotie spēki 2006. gadā atteicās no obligātā militārā dienesta un pārgāja uz profesionālo militāro dienestu, kas nozīmē, ka katrs no karavīriem ir profesionāli sagatavots karavīrs savu pienākumu izpildei. Lai karavīru profesionāli sagatavotu, valsts viņa izaugsmei iegulda gan laiku, gan līdzekļus, gan citus nepieciešamos resursus. Lai kļūtu par profesionālā dienesta karavīru – karavīrs nepārtraukti sava dienesta laikā atrodas pašpilnveides procesā. Karavīra pašpilnveide tiek realizēta, izmantojot vairākas komponentes. Rakstā tiek pētīti un analizēti publiski pieejamie dokumenti, kas nosaka, kā tiek realizēta karavīra pašpilnveide Nacionālajos bruņotajos spēkos. Pētījums ir veltīts arī faktoru izpētei, kuri veicina karavīru pašpilnveidi – izglītojoties gan militārajā, gan civilajā sfērā, attīstot sevi fiziski, kā arī kopumā gūstot militāro pieredzi. Tā kā raksta mērķis ir veltīts karavīru pašizaugsmes procesa realizācijas iespējām Nacionālajos bruņotajos spēkos, darbā tiek analizēta atbilstoša situācija citās valstīs, detalizētāka izpēte ir veikta NBS "X" vienībā ar tādām izpēti metodēm, kā anketēšana, kā arī atbilstošo struktūrvienību vadītāju intervijas.

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THE ROLE OF INNOVATION IN EDUCATION

The article is devoted to the concept of "innovation" in the field of education. The problem of a broad interpretation of the term "innovation" in the practice of implementing relations between the subjects of educational activity is posed. Based on the consideration of changes in the field of innovative education in Western countries, proposals are made on the formation of a regulatory framework for the innovation activity of higher education not only as a source of development of the education system itself, but also as a process of forming an "innovative specialist".

MATEMĀTIKA

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MATHEMATICS

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BOUNDARY VALUE PROBLEMS FOR LIÉNARD TYPE EQUATIONS (CASE 3) WITH QUADRATIC DAMPING

Cubic differential equations are considered together with the two-point boundary conditions. The quadratic term, containing the derivative, is added. Using the Sabatini transformation, we reduce this equation to the equation, not containing the derivative of unknown function. The equation case3: $x'' + (x/(1-x^2)) x'^2 + g(x) = 0$ (*) can be reduced to a conservative. Our goal is to compare behaviour of solutions of (*) with that for shortest equation $x'' + g(x) = 0$. We attract our attention to the case $g(x) = a x - b x^3$. In particular, we would like to compare the number of solutions for the damped equation and shortened one.

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MULTIPLICITY OF POSITIVE SOLUTIONS FOR A BOUNDARY VALUE PROBLEM ARISING IN HEAT TRANSFER

We consider a three-parameter nonlinear boundary problem $x'' + (1-a)/t x' + F e^x = 0$, $x(r) = 0 = x(1)$, $0 < r < 1$, $F > 0$.

arising in heat transfer. We use the Krasnosel'skij-Guo fixed point theorem to prove multiplicity of positive solutions for the boundary value problem.

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MŪZIKA

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MUSIC

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ĀRTIJS ŠOVS PERSONĪBA - DAIĻRADE

Atslēgvārdi: Ārtijs Šovs, džeza, komponists un interprets

Ārtijs Šovs, īstajā vārdā Arturs Jakobs Aršavskis (1910–2004), izcils džeza mūziķis, klarnetists, komponists. Dzimis Ņujorkā imigrējošo ebreju ģimenē, 12 gadu vecumā sāka apgūt alta saksofona spēli un jau 15 gadu vecumā pievienojās Kavallaro deju grupai.

Ārtija Šova muzikālās kristības notika Ņujorkas Imperiālajā teātrī (*Imperial Theater in New York*) 1936. gada 24. maijā, kur *Svinga mūzikas koncertā* līdzās tā laika zvaigznēm – Lūisam Armstrongam, Benijam Gudmenam, Djukam Elingtonam un citām zvaigznēm, uzstājās vēl nevienam nezināmais *Ārtija Šova stīgu ansamblis*. Pārsteidzoši, par šī vakara uzstāšanās hītu kļuva Šova priekšnesums ar skaņdarbu *Interlude in B Flat*. Tā piedzima jauna džeza zvaigzne.

1936. gadā Šovs izveidoja klasisko Bigbendu ar mēlišu instrumentu grupu (saksofons, klarnete) – metālpūšamajiem instrumentiem (trompetes, tromboni) un ritma sekciju (bungas, kontrabass, ģitāra). Laika posmā no 1938. gada līdz 1939. gadam, Šovs ar grupu plaši koncertē un ieraksta savas kompozīcijas. Viens no slavenākajiem Šova ierakstītajiem skaņdarbiem šajā laikā – *Koncerts klarnetei*.

1940. gadā Ārtijs Šovs izveidoja jaunu grupu *Gramercy Five*. Ar šo apvienību Šovs ierakstīja savas četras slavenākās kompozīcijas – *Special Delivery Stomp*, *Summit Ridge Drive*, *Keepin' Myself For You* un *Cross Her Heart* – līdz ar to sasniegta visus iespējamus savas daiļrades augstumus. 1962. gadā īpašā ceremonijā Ņujorkā Šovs saņēma balvu *Zelta disks (Golden Disc)* par miljoniem pārdotiem ierakstiem: *Begin the Beguine*, *Nightmare*, *Traffic Jam*, *Dancing in the Dark*, *Stardust*, *Summit Ridge Drive*, un *Back Bay Shuffle*. Visos šajos ierakstos ir dzirdama Ārtija Šova klarnetes spēle, kura ir ievērojama ar savu daudzveidīgo toni un pārsteidzošo tehniku.

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COMPARISON OF INTERPRETATIONS OF IOLANTA'S ARIOSO FROM THE OPERA IOLANTA BY PYOTR TCHAIKOVSKY

Iolanta's Arioso from P. Tchaikovsky's opera Iolanta is one of the most popular and visible opera numbers, which is very often found in the repertoire of many famous singers. As a result, there were ample opportunities to compare interpretations. Three entries were selected to compare Iolanta's arioso from Tchaikovsky's opera: a symphonic interpretation by Russian opera singer Galina Vishnevskaya and the Bolshoi Theater in Moscow, an interpretation by Lithuanian opera singer Asmika Grigoryan and a Roman orchestra and an interpretation by Russian opera singer Ekaterina Sherbachenko and the Madrid Symphony Orchestra.

In order to be able to reasonably compare the selected Iolanta arioso from P. Tchaikovsky's opera Iolanta interpretation, criteria are needed. The following criteria will be used for comparison in this work: tempo, dynamic hues, agogy, articulation, orthoepy, phrase, characterization of the image, interaction with the accompaniment.

Summarizing all the obtained information about selected interpretations of Iolanta's arioso from P. Tchaikovsky's opera Iolanta, it can be said that the closest to the composer's intention is Ekaterina Sherbachenko interpretation of Iolanta's arioso from P. Tchaikovsky's opera Iolanta. This is evidenced

by the widespread use of pace and dynamics, a strong focus on content discovery through clear orthoepy and active articulation. In addition, the fact that the interpretation is performed during the performance of the opera itself strengthens the performer's sensitivity to the imagine.

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JĒDZIENS DZIESMA, DZIESMU CIKLS BŪTĪBA. F. ŠŪBERTA DZIESMAS "MEIN" NO "SKAISTĀ DZIRNAVNICĒ" INTERPRETĀCIJU SALĪDZINĀJUMS

Jēdziens *dziesma* – vārdiski muzikāls sacerējums, ko izpilda vienbalsīgi vai daudzbalsīgi (koris), bieži kāda muzikāla instrumenta pavadījumā. Dziesmas pamatā ir skaidra melodiskā līnija, kas atklāj teksta būtību, vai arī noteiktu emocionālo stāvokli, noskaņu.

Dziesma – visizplatītākais vokālās mūzikas veids. Izšķir tautas un profesionālo komponistu sacerētas dziesmas.

Dziesmu cikls (vāc. Liederkreis). Dziesmu apkopojums, ko komponists sagrupējis mākslinieciskā vienotībā un attiecināms uz vienu konkrētu, noteiktu tēmu – mīlestība, nāve, greizsirdība, daba utt. – vai arī tas ir kāds stāsts, vai arī stāsts ar konkrētu tēmu.

Pētot jēdzienu *dziesmu cikls* jāpiemin, ka šī žanra viens no nozīmīgākajiem faktoriem ir mūzikas saistība ar vārdiem. Liriska poēma, viens no literārā romantisma galvenajiem spēkiem astoņpadsmitā gadsimta beigās.

Trīs interpretu īss, salīdzinošs (metronomiskā izpausme, agoģika, izpildījuma maniere, skaņdarba dinamika, skaņdarba frāzējums, muzikālais tēls, dikcija, ortoēpija) raksturojums izpildot F. Šūberta dziesmu „Mein” no dziesmu cikla „Skaistā dzirnavniece”.

FILOLOGIJA

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PHILOLOGY

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DISPUTES INSIDE THE RUSSIAN EMIGRATION. JOURNAL СИНТАКСИС (PARIS, 1979) IN POLEMIC WITH ALEKSANDR SOLZHENITSYN IN THE MATTERS OF RUSSIAN NATIONALISM AND THE FUTURE OF RUSSIA

Key words: Russian emigration, Russian exile in Paris, the third wave of Russian emigration, the journal *Sintaksis*, Aleksandr Solzhenitsyn, Andrei Sinyavsky, Russian nationalism, polemic

For the given paper, selected texts from *Современные проблемы* section were analysed, their polemical character being a unifying element (which is also suggested by the subtitle of the journal: polemic). First of all, the subject of the main interest is background of these texts – circumstances under which the journal *Синтаксис* was founded, with motivations of his founder, Russian literary scientist and writer Andrei D. Sinyavsky. Chosen authors enter into discussion with Aleksandr Solzhenitsyn, the most prominent representative of the third wave of Russian emigration. In their essays they do not focus primarily on literature, but emphasise contemporary problems of Russian emigration, as well as soviet society – Russian nationalism and future of Russia. Authors oppose A. Solzhenitsyn mainly in the question of whether a democratic route is at all possible. At the same time, they are trying to highlight issues that could be brought about by Solzhenitsyn's role as a leader and prophet. Ideological focus of selected texts then underlines the position which argued the journal *Синтаксис* itself in a political and social context during the third wave of Russian emigration.

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ERRORS IN FUTURE REFERENCE BY ENGLISH PHILOLOGY STUDENTS

Key words: *errors, future reference, students, philology, error analysis, grammar*

Globalisation and the development of modern technology have facilitated the adoption of English in all spheres of life. English has become a universal way of communication between different cultures and peoples. The relevance of this study is mediated by the importance for the English philologist of knowing English grammar in general, and the rules of the future reference in particular. The goal of the term paper is to identify the most frequent errors in future reference made by 1-year English philology students. The research methods are as follows: the theoretical research methods – literature analysis as well as analysis and synthesis of theoretical information of the future reference, grouping and comparison methods. In the empirical part fervency analysis and sample survey are used. At the result, it has been established that future reference can be classified into 9 groups. It can be concluded that the most frequent errors are made in the group *Other cases, especially in the construction be looking + infinitive*.

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MŪSDIENU TERMINOGRĀFIJA: JAUNĀKĀS ATZIŅAS UN PĒTĪJUMI LATVIJĀ UN PASAULĒ

Leksikogrāfijas vēsture ietver ilgstošus periodus ar nelielām un pakāpeniskām izmaiņām esošajā paradigmā, kā arī relatīvi īsus periodus ar pēkšņām un pamatīgām pārmaiņām. Leksika ir vismainīgākā valodas daļa, jo tajā pārmaiņas notiek nepārtraukti – leksika tiek papildināta ar jaunvārdiem, esošajiem vārdiem veidojas jauni semantiskie varianti, daļa vārdu zūd, zaudē lietojuma aktualitāti vai arī iegūst jaunu funkcionālo vai ekspresīvo raksturu. Šis leksikas vēsturiskais mainīgums atspoguļojas leksikogrāfiskos izdevumos, galvenokārt skaidrojošajās vārdnīcās, tostarp, terminu vārdnīcās. Šobrīd ne tikai Latvijā, bet arī pasaulē tehnoloģiju laikmetā leksikogrāfija kā zinātniska disciplīna piedzīvo fundamentālu paradigmu maiņu, piemēram, izdevniecības pārtrauc drukāto vārdnīcu izdošanu, atklāti vairāki datu un informācijas pārslodzes veidi un problēmas, ar ko saskaras elektronisko vārdnīcu lietotāji un sastādītāji. Šobrīd dzīves tempa un globalizācijas dēļ vēl vairāk kā nekad ir vajadzība pēc jauniem un precīziem terminiem, taču Latvijā terminoloģijā notiek pretējais – jaunas terminu vārdnīcas tiek izdodas reti un pieejamās datubāzes netiek regulāri papildinātas. Modernās tehnoloģijas ir būtiski mainījušas ne tikai vārdnīcu sastādīšanu, bet arī to klāstu, kas tiek piedāvāts vārdnīcu tirgū. Tehnoloģiju ietekme nenoliedzami ir mainījusi vārdnīcu struktūru un to saturu, kā arī ieviesušas pārmaiņas veidā, kādā mēs šodien piekļūstam dažādiem informācijas avotiem un apstrādājam tos. Referātā tiks apskatīti mūsdienu terminogrāfijas jaunākie pētījumi un problēmjautājumi gan Latvijā, gan pasaulē.

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TYPES OF WORDPLAY IN ENGLISH MASS MEDIA

Key words: *wordplay, mass media, literary devices, techniques*

Wordplay or as it may also be called *play on words* is the clever and witty use of words and meaning. It involves using literary devices and techniques like *spelling, assonance, rhyme, consonance, acronym, alliteration, slang, onomatopoeia* and *pun* to form amusing and humorous written and oral expressions. Spelling, aspects of rhetoric, phonetics and semantics dominate the use of wordplay techniques; they are an important part of the use of wordplay. Wordplay is a frequent and common phenomenon and an inseparable part of communication.

Although the definition of wordplay is rather concrete, the situation with the classification of wordplay is not so clear-cut. There are several types of wordplay distinguished by a number of scholars, and each type has its own aspects and nuances, which makes it more convenient to distinguish between them. Wordplay is divided in types such as *acronyms, anagrams, chronograms, initialisms, lipograms, malapropisms, mondegreens, onomatopoeias, portmanteaus, and spoonerisms*.

Many types of wordplay are used in English mass media. Thus, the author of the present article has studied the data – instances of various types of wordplay elicited from English mass media and found out the most common and important types of wordplay used. The article presents both the quantitative and qualitative data analysis. As a result of the research, the author detected that the use of wordplay in English mass media is of high importance.

FIZIKA

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PHYSICS

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CO₂O₃ NANOSTRUCTURES FOR HYDROGEN PEROXIDE ELECTROCHEMICAL DETECTION

Hydrogen peroxide is present naturally in any living cell. Although hydrogen peroxide concentration in cell is strictly regulated during normal metabolism, several human diseases lead to increased hydrogen peroxide concentration in body fluids. It is beneficial to monitor hydrogen peroxide levels in human body for early disease diagnostics. This can be done by creation of electronic device, which will use electrochemical sensor in order to perform automated hydrogen peroxide concentration measurement in sample. Such electrochemical sensor require the use of electrodes with specific surface coatings, that will chemically react with target compound under electrical current. In this study, hydrogen peroxide electrochemical detection was achieved by use of Co₂O₃ nanostructure coated electrodes.

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ELECTROCHEMICAL HYDROGEN PEROXIDE SENSOR BASED ON COPPER OXIDE NANOSTRUCTURES

Hydrogen peroxide (H₂O₂) is a strong oxidant and an essential intermediate product in many biomedical reactions. In high concentrations it can cause serious harm to human health and the environment. Therefore, rapid and accurate determination and control of H₂O₂ concentration is an important task in many areas, including pharmaceuticals, environmental protection, industrial areas (especially food production) and others.

This study proposes a non-enzymatic H₂O₂ electrochemical sensors using copper wire electrodes with nanostructured copper oxide (CuO) coatings. CuO petal nanostructures were obtained by a one-step hydrothermal oxidation method. The structure, surface and composition of the obtained samples were studied using FESEM along with EDS and XRD. The resulting nanostructured samples were used for electrochemical determination of the H₂O₂ content in a 0.1 M NaOH buffer solution using cyclic voltammetry, differential pulse voltammetry and i-t measurements. Experiments were also carried out to detect H₂O₂ in real milk samples.

According to the obtained results, this sensor is suitable for practical use for the qualitative detection of H₂O₂ in real samples, as well as for the quantitative determination of its concentration.

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NEGATIVE RESIST THIN FILM SURFACE MODIFICATION BY FOCUSED ELECTRON BEAM

In this study, we demonstrated a method for the modification of a thin film by a focused electron beam and subsequent development in an etcher. A freshly made film is irradiated with a focused electron beam at defined locations with variable exposure to deliver the required dose to that site. After irradiation, the film is placed in a developing etchant, after which the final structures with a minimum element size of 30 nm and a height of up to 200 nm appear. After obtaining the sample, the main irradiation parameters of the resist, as well as the diffraction intensity and the chemical composition of the film were measured.

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THE EFFECTS OF BEAM FOCUSING AND HYDROCARBON CONTAMINATION IN SEM VACUUM CHAMBER ON NANO-STRUCTURE FORMATION ON AG SURFACE BY FOCUSED ELECTRON BEAM IRRADIATION.

Metal nanostructures are used in a variety of fields, like photonics, plasmonics or X-ray mask fabrication due to their ability to absorb or emit light in frequencies, which depend on their size and shape. Recently it was shown, that irradiation by focused electron beam causes nanostructure growth on metal surfaces. Size and shape of these structures can be precisely controlled by adjusting beam current and irradiation time. It is known, that hydrocarbon contamination is always present in vacuum systems, but it can be reduced by plasma cleaning procedure. In this work we assess the effect of changing beam focusing on the size and shape of resulting structures on Ag surface, as well as how nitrogen plasma cleaning procedure affects the nanostructure growth.

PSIHOLOĢIJA

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PSYCHOLOGY

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“WHO IS YOUR ROLE MODEL?” PSYCHOLOGICAL ANALYSIS OF MODERN CHILDREN’S AND ADOLESCENTS’ HEROES/IDEALS

In the development of personality, the ideal that one has chosen in childhood and adolescence influences behavior, motivation, moral values, self-esteem, as well as self-development, thus creating qualities of the ideal character of a self-image that resemble the chosen ideal.

Based on technological progress and the rapid development of digitalization, a new generation is socializing in a digital social environment, therefore, research on modern ideals and how they stimulate personal development as intelligent, socially productive or unproductive personalities is becoming increasingly important in pedagogy. It can also be defined as a psychological problem, but particularly when studying the phenomenon of the ideal image. It becomes topical during the time when the development of the new generation is taking place in new conditions and in the context of digitalization and transformation of moral norms.

The aim of the research: to study the content of contemporary children and adolescents’ ideal and to perform a psychological analysis.

The study involved 120 respondents, who were divided into three age groups: 6-9; 10-12; 13-15.

The methodology of study: Express survey includes questions: “*Who is a person I want to look like? Why?*”

The analysis and interpretation of the research results were carried out on the basis of qualitative analysis by answering the following questions:

1. What is the ideal for today’s children and teenagers?
2. What are the motives for choosing the ideal?
3. What are the characteristics, attractiveness and value of the ideal for contemporary children and adolescents?
4. Which values do those ideals describe?
5. How are values changing during schooling in different age groups?
6. What are the differences between the ideal image groups?

The study revealed trends specific to each study group as well as specific intra-group phenomena.

The research proved that the ideal psychological content is determined by the social condition in which the particular child’s or adolescent’s development takes place.

Unreal or imaginary hero/ideal reflect the world a child or adolescent live in, experiencing real, satisfying relationships and getting universal moral values; or, on the other hand, they compensate a lack of relationships and needs, such as belonging, self-esteem which leads to socially unproductive life goal.

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CARING FOR FAMILY MEMBER SUFFERING FROM CHRONIC HEALTH DISORDER: LITERATURE REVIEW

Key words: care, family caregivers, chronic health disorders, quality of life, literature review

Chronic mental or physical illness of a family member causes significant disruption of the family system, which has a significant impact on the quality of life of all involved and leads to a heavy emotional and psychological burden. Recently, the interest of researchers in the role of people who support their family members with chronic health problems has increased significantly. This support is linked to the social, psychological, and emotional context of the caregiver's life, as well as ways to combine caregiving with work life and successful cooperation with healthcare professionals. In Latvia, little research has been done on the social, psychological, and emotional contexts and quality of life of people willingly and permanently taking care of their chronically ill family members. Therefore, to get a deeper understanding of the research themes, methodologies, and results in the global context, it is necessary to conduct a review of the literature on psychological studies focusing on caregivers of their long-term chronically ill family members. The literature review aims to compile and analyze studies on the social, psychological, and emotional needs and quality of life of chronic patients and their family caregivers. The article will revise the main fields of research on this topic, including areas such as chronic patients and their needs, stress, disease management and care strategies in the family, quality of life of family caregivers, psychological well-being and resilience, and relationships between caregiver and dependent. The care of a chronic patient has a significant impact on the overall family system, internal and external relations, and the situation of life of all involved. However, people are able to find healthy solutions in difficult life situations, so it is important to take into account the resilience of caregivers. Studies have already identified a variety of factors that affect the quality of life of caregivers of chronically ill family members. The results of this investigation will be used to select an appropriate methodology for the future empirical study related to the care of family members suffering from chronic health disorders in Latvia. The paper concludes with a synopsis of theoretical and methodological considerations of the topic as well as suggestions for future studies.

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EPISTEMOLOĢISKĀS ATTIEKSMES KONCEPCIJA

Atslēgvārdi: epistemoloģiskās attieksmes koncepcija, izziņas sistēma, holistiskais konstruktīvoisms, metodoloģija, modelēšana

Izziņas pētīšana ir fundamentāls un aktuāls virziens, kas ir atvērts jaunajiem skatījumiem un teorētiskajiem izaicinājumiem. Autori ierosina epistemoloģiskās attieksmes koncepciju, kura apvieno daudzpusīgu izziņas subjektu, sarežģītus zināšanu objektus un iesaista daudzlīmeņu zināšanas. Izveidota izziņas sistēma, modelēti, aprakstīti un paskaidroti izziņas sistēmas elementi – sistēmiskā kvalitāte, izziņas mehānisms un epistemoloģiskās attieksmes sistēmiski dinamiskais modelis. Epistemoloģiskās attieksmes koncepcija iekļauj trīs sastāvdaļas – epistemoloģiskās attieksmes satura modelis, epistemoloģiskās attieksmes attīstības modelēšana un epistemoloģiskās attieksmes tipoloģija. Satura modeļa teorētisko un metodoloģisko pamatu veido holistiskā konstruktīvisma pieeja un trīs līmeņu metodoloģija, filosofiskā, vispārzinātniskā un konkrēti zinātniskā. Filosofiskā metodoloģija pamatojas uz konstruktīvisma principiem un epistemoloģiju. Vispārzinātniskajā metodoloģijā atskaites punkts ir sistēmas princips sarežģīto sistēmu modelēšanā. Konkrēti zinātniskajā metodoloģijā tiek izmantotas dažādas personības, sociālās un kognitīvās psiholoģijas teorijas un metodoloģijas. Epistemoloģiskās attieksmes modelēšana tās attīstībā balstās uz postulātiem, kas atspoguļo izziņas kā sarežģītās sistēmas pamata un funkcionēšanas principus. Epistemoloģiskās attieksmes tipoloģija ir izziņas subjekta ar dažādiem izziņas objektiem mijiedarbības klasifikācija un raksturojums pēc zināšanu iesaistīšanas līmeņa, kvalitātes, aptveramības un dziļuma.

Epistemoloģiskās attieksmes koncepcijai ir teorētiskais un empīriskais potenciāls izziņas izpētē. Tā ļauj modelēt dažādus ar izziņu saistīto objektu sociālos konstruktus, izpētīt to epistemoloģisko un sociāli psiholoģisko nozīmi, noteikt subjekta vajadzības pēc zināšanām un veidot izziņas prognozes sabiedrībā, izglītībā un zinātnē.

**Layout of Manuscripts for the collection
“Proceedings of the 64th international scientific conference of Daugavpils University”**

“Proceedings of the 64th international scientific conference of Daugavpils University” publishes original papers, based on the presentations at the international conference, held in Daugavpils, 21–22 April, 2022. Proceedings of the scientific international conference of Daugavpils University are published electronically on www.dukonference.lv since 2010. It is not issued in paperback.

Language. All submitted articles need to be written in English (Latvian, Russian, German, Spanish, French, Polish, Lithuanian, Swedish – in the corresponding linguistic work groups of the humanities).

The rules for the paper setting:

- The article should be written in a version of *MS Word*, adapted for the *Windows* operating system (DOC/DOCX file). If non-standard font is used, please send it along with the article by e-mail.
- **Structure of the article:**
 - the full Title of the article (font size – 16; **bold**; Caps Lock);
 - Author’s full name(s) (font size – 14; **bold**);
 - Institution, Address, e-mail (font size – 12);
 - Abstract in English and Latvian – 1500 characters (font size – 10; line spacing – 1);
 - Key words (5–6) should be in abstract language (font size – 10; *italic*);
 - Text of the article. The recommended length of submissions is 12 000 – 15 000 characters (font size – 12; line spacing – 1,5; margin – 2.0 cm). It is recommended to divide the body of the text into the following chapters (humanities and social sciences): *Introduction (the Aim of the Article, Material and Methods)*, *Discussion*, *Conclusions*, *Acknowledgement*, *References*. It is recommended to divide the body of the text into the following chapters (natural sciences): *Introduction*, *Material and Methods*, *Results*, *Discussion*, *Conclusions*, *Acknowledgement*, *References*.
 - Pictures, figures, charts and diagrams should be attached as jpg, gif or tif separate files, as well as must be included in the manuscripts text. Tables should comprise only vertical and horizontal lines. Tables, graphs, diagrams, charts and other illustrative materials should be presented indicating the source of the material and, if necessary, the methods applied to draw up tables, graphs, diagrams, charts (calculation, data summarizing and so on). All these materials should have a number and a heading;
 - Remarks and explanations should be placed at footnotes;
 - References (font – 12, line spacing – 1).
- References and remarks:
 - References should be indicated in the text by giving the author’s surname with the publication year, e.g., (Turner 1990), and if from concrete page, e.g., (Turner 1990: 12);
 - if abbreviations are used in references (e.g. titles of dictionaries, etc.) they must be deciphered in bibliography but in the text reference just the volume and page

numbers may be indicated without mentioning the year of publication, e.g. (LKV II: 81);

- all the sources referred to in the text must be included in the References in the alphabetical order, by the author's (authors') surname(s) or by the title (font size – 12; line spacing – 1).
- An electronic version of the article must be provided to the editor by e-mail (**konference@dukonference.lv**) until **31.05.2022**.

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- 1) novelty of the theme and scientific level of manuscript;
- 2) style and compliance of key words and summary with the content of manuscript;
- 3) compliance with conventions for publication.

Sample

IMPROVEMENT OF QUALITATIVE RURAL LIVING ENVIRONMENT IN LATVIA IN LEADER PROGRAM FRAMES

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Abstract

Improvement of qualitative rural living environment in Latvia in LEADER program frames

Key Words:

Abstract text.....

Kopsavilkums

Kvalitatīvas lauku dzīves vides uzlabošana Latvijā LEADER programmas ietvaros

Atslēgvārdi:

Kopsavilkuma teksts

Body text.....

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