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**CBU International Conference on Innovations in Science and Education 2022**  
**Book of Abstracts**

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**Petr Hájek, Ondřej Vít**

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## INTRODUCTION

We had the great honor of organizing the CBU International Conference on Innovations in Science and Education 2022 in Prague, Czech Republic. The event was affected by the coronavirus pandemic as every other aspect of life since 2020 worldwide. Since 2013 the conference became an important international event in a cross-industry discussion about innovations in Education and Science.

CBUIC 2022 was organized by the CBU Research Institute, Unicorn University, and ISE Research Institute, all three located in Prague, Czech Republic. The CBU Research Institute published the proceedings.

Three cooperating organizations supported this conference. The participation was lower due to the coronavirus pandemic.

As every year, the purpose of CBUIC 2022 was to provide a forum for the participants to report and review innovative ideas with up-to-date progress and developments, discuss novel approaches to the application in their research areas and discuss challenges of doing science and education.

We sincerely hope that exchanging ideas on doing research, science, and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf of the Organization Committee of CBUIC 2022, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of CBUIC 2022, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the CBUIC 2022 secretariat and the CBU RI staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

*Petr Hájek, CBU Research Institute, Unicorn University*  
*David Hartman, Unicorn University*  
Conference chairs

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## **1 – ECONOMICS AND BUSINESS**

## MODELING AND ANALYSIS OF THE ECONOMIC DEVELOPMENT OF AZERBAIJAN BASED ON THE PRODUCTION FUNCTION

Esmira Ahmadova<sup>1</sup>

**Abstract:** The study aims to identify the economic development potential by modeling and identifying the turning points in the development of the Azerbaijani economy corresponding to the phases in the economic cycle. Overall, the paper presents the results of the analysis of the development of the Azerbaijani economy using production functions (PF). The empirical characteristics of the PF made it possible to periodize the considered time interval i.e. identify areas with different behavior of empirical characteristics. Moreover, it was revealed that these sections are repeated within a certain period. The specifics of economy modeling are determined using the methods of production variables based on the annual data of the State Statistical Committee for 1997–2021. The methodological basis of the study is the economic and mathematical apparatus of the classic Cobb–Douglas production function. The calculations were performed using freely distributed modern software, the statistical environment R: which is one of the most dynamically developing programs in its class. As a result of the study, we identified the chronological boundaries of short-term and medium-term economic cycles in the economy of Azerbaijan, analyzed the patterns of production variables in different periods of the cycle. The article provides the results of modeling the GDP dynamics in Azerbaijan, which are described by production functions with a significantly different set of parameters; identifies important macroeconomic variables; provides an econometric analysis of the models, production variables, and corresponding conclusions.

**JEL Classification Numbers:** C01, E17

**Keywords:** production function, modeling, GDP, Azerbaijani economy, econometric analysis.

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<sup>1</sup> Azerbaijan State University of Economics (UNEC), Department of Economics, Russian School of Economics, Baku, Azerbaijan, esmira.ahmadova@unec.edu.az; fbc.baku@gmail.com

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## INNOVATIONS IN SPORT FINANCING IN THE SLOVAK REPUBLIC

Gábor Asványi<sup>1</sup>, Patrik Hrbek<sup>2</sup>, Alexandra Ožvaldová<sup>3</sup>, Peter Plavčan<sup>4</sup>

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**Abstract:** Sport is an important social phenomenon that promotes social and cultural values such as peace, respect for human rights, solidarity, and mutual understanding between nations and cultures. At the same time, sport is also an important economic reality. Therefore, the funding of sports is an important priority, and, in addition to the above-discussed benefits, it also brings economic benefits. The basic goal of the present study is to provide an overview of the financial mechanism and to discuss the sources of funds for sporting events in the Slovak Republic. The funds from the State budget allocated for sporting activities in the form of contributions to recognised sports, subsidies and contributions to a national sports project are described in detail for its implementation. Furthermore, pre and post Covid-19 pandemic sports legislation in Slovak legislation were compared. At the same time, these new legal regulations were compared and interpreted from the context of the legal orders of the Slovak Republic.

**JEL Classification:** F62, H10

**Keywords:** funding, expenditure on sport, legislation in sport, sport projects

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<sup>1</sup> Danubius University, Faculty of Public Policy and Public Administration, Sládkovičovo, Slovak Republic. asvanyi@olympic.sk

<sup>2</sup> Danubius University, Faculty of Public Policy and Public Administration, Sládkovičovo, Slovak Republic. hrbek@olympic.sk

<sup>3</sup> Danubius University, Faculty of Public Policy and Public Administration, Sládkovičovo, Slovak Republic. alexandra.ozvaldova555@gmail.com

<sup>4</sup> Danubius University, Faculty of Social Studies, Sládkovičovo, Slovak Republic. peter.plavcan@vsdanubius.sk

## **OPENING E-MAIL MARKETING MESSAGES ON SMARTPHONES: THE VIEWS OF MILLENNIAL CONSUMERS**

**Belem Barbosa<sup>1</sup>, Ricardo Carneiro<sup>2</sup>**

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**Abstract:** Recent years have witnessed a steep rise in the adoption of smartphones and their prevalence in all the activities related to internet browsing. Consequently, mobile devices should be essential to any digital marketing strategy. At the same time, some digital marketing tactics such as e-mail marketing became popular due to their reported efficacy and return on investment. Still, research on e-mail marketing is scarce and consumers' behavior towards e-mail campaigns received on their smartphones has not been addressed. Considering this research gap, the present study aims at identifying the factors responsible for opening promotional emails on the smartphones by millennial consumers. Based on the available literature on e-mail marketing message opening behavior, an exploratory study was conducted among 12 Portuguese Millennials. Results of the study show that smartphones are a preferred medium for receiving promotional e-mails, due to the convenience it offers and the preference of the participants for their smartphones to perform their personal tasks. Still, to make the users open e-mail messages on their smartphones, the subject lines should be relevant for e.g., it should promise some economic benefits and limited time offers. Overall, this study demonstrates that smartphones provide a very attractive yet challenging medium for companies to communicate with their customers and prospects through e-mail marketing. It also discusses the relevance of the topic for future research.

**JEL Classification Numbers:** M31

**Keywords:** e-mail marketing, millennial generation mobile devices.

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<sup>1</sup> Research Unit on Governance, Competitiveness, and Public Policies (GOVCOPP), Center for Economics and Finance at the University of Porto (cef.up), School of Economics and Management, University of Porto, Portugal, marketing.belem@gmail.com, ORCID: 0000-0002-4057-360X

<sup>2</sup> University of Aveiro, Portugal, ricardo23carneiro@gmail.com

## IMPACT OF UNCERTAINTY ON HUNGARIAN, CZECH, AND POLISH CURRENCIES

Dominika Békesová<sup>1</sup>, Mária Bohdalová<sup>2</sup>

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**Abstract:** The present study examined the impact of uncertainty on the exchange rates of currency pairs traded at the Visegrad Group, except the currency of Slovakia. The USD/EUR exchange rate is considered the main influential factor affecting the exchange rates of the currency pairs of Hungary, Czech Republic, and Poland. The study analysed the exchange rates return of these three countries from 1 January 2010 to 31 December 2020. This period covers the announcement and implementation of Brexit; therefore, USD/GBP is considered the second influential factor affecting the exchange rates of the stated currencies. Moreover, the VIX, EMV, and EPU indices are selected as additional uncertainty indicators. The proposed regression model measures the impact of uncertainty on the exchange rates of the selected currencies. It has been discovered that the USD/EUR exchange rate returns significantly influenced the exchange rate returns of the stated currencies during the period under study. In addition, USD/GBP exchange rate returns also had a statistically significant impact on all the currency pairs at the beginning of the analysed period. However, its influence keeps fluctuating throughout the analysed period. The impact of VIX was weak throughout but statistically significant for USD/HUF and USD/PLN exchange rates. On the other hand, the study finds that EMV and EPU indices do not have a pronounced impact on the analysed exchange rate returns. As demonstrated, the uncertainty indices had a relatively higher impact on the development of the observed exchange rate returns. However, the study finds that their impact was often not statistically significant; moreover, the index impacts themselves were quite low.

**JEL Classification Numbers:** C20, D80, E40, E47, F31

**Keywords:** exchange rate, uncertainty, Visegrad currencies, Brexit, VIX, EMV, EPU

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<sup>1</sup> Comenius University in Bratislava, Faculty of Management, Department of Quantitative Methods, Bratislava, Slovakia, bekesova8@uniba.sk

<sup>2</sup> Comenius University in Bratislava, Faculty of Management, Department of Quantitative Methods, Bratislava, Slovakia, maria.bohdalova@fm.uniba.sk, ORCID: 0000-0002-6870-2100

## THE INFLUENCE OF THE MACROECONOMIC ENVIRONMENT ON THE FINANCING DECISION IN SMES

Erika-Maria Doacă<sup>1</sup>

**Abstract:** Small and medium-sized enterprises are considered the engine of economic growth, as they play an important role in a country's economy by significantly contributing to its economic growth and job creation. However, one of the biggest problems SMEs face is the lack of access to finance. Lack of access to finance affects the existence of SMEs and the possibility of their speedy recovery from a crisis. The present study aims to conduct an empirical analysis of the influence of macroeconomic variables on the performance of small and medium enterprises. The study also includes the credit indicator granted to the private sector by banks, to analyze whether SMEs performance is influenced by access to finance, especially in a competitive economy. The main objective of the study is to investigate the determinants for improving the SME's performance and the impact of access to finance on it among the Member States of the European Union located in south-eastern Europe. The economic theory states that access to finance influences a company's performance. The present study is based on the secondary data on the macroeconomic environment of the states under study and is obtained from the Eurostat and the World Bank. The study is empirical cum qualitative in nature and based on Panel data. The analysis period is 11 years from 2010 to 2020. The data analysis is done with the help of the econometric software "EViews". The findings of the study indicates that the macroeconomic environment influences the financing decisions of most small and medium- sized enterprises. Also, due to the pandemic of COVID-19, the macroeconomic environment has deteriorated, and access to finance is especially a vital issue for the SME sector. The results confirm that the real GDP growth rate influences the financing decision of SMEs. Considering the vital importance of the SMEs in a country's economy and the devastating impact of the COVID-19 pandemic on small and medium-sized enterprises, the paper is of high interest in solving the problems of access to finance.

**JEL Classification Numbers:** G10, L25, O11

**Keywords:** funding, SMEs, performance, competitiveness

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<sup>1</sup> Alexandru Ioan Cuza University of Iasi, Doctoral School in Economics and Business Administration, Finance specialization, Iasi, Romania, doaca.erika@yahoo.com

## **IMPACT OF COVID-19 ON IT EMPLOYEES' JOB PERFORMANCE – A COMPARATIVE ANALYSIS**

**Stanislava Ivanova<sup>1</sup>, Irina Yanchovska<sup>2</sup>**

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**Abstract:** The research paper examines how the job performance of IT employees changed during the pandemic when remote work was the predominant mode of operation for more than a year. The study also investigates how the different aspects of job performance have evolved during the research. Quantitative data was collected through a longitudinal survey conducted in 2019 and then repeated in 2021. In the first phase, the sample consisted of 126 international respondents working in over 25 different IT companies, while in the second phase, 149 respondents from over 60 different organizations were covered. The data for the study has been analysed by using one-dimensional mean value comparison, correlation, and regression analysis. In the first phase of the survey conducted before the pandemic, quality of work, effectiveness, and value-added performance have the strongest influence on job performance, at the same time employees' productivity and proactiveness did not show a direct impact on their overall performance. In the second phase of the study conducted in the summer of 2021, the results show that employees' perception of their value-added performance to the organization no longer impacts their overall performance. Additionally, during the pandemic, a downward trend was observed in all the elements of job performance, with the most significant decrease in employees' overall performance, quality of work, and effectiveness. The results of the study can be compelling to different levels of the organisations, as good job performance of employees is significant for the performance results of teams, business units, and organisations. Understanding employees' job performance, its elements, and how it changes over time, especially during the pandemic, can help organisations thrive and develop a more productive workforce.

**JEL Classification Numbers:** J24, L86, M54, O15

**Keywords:** COVID-19, individual performance, IT employees, comparative analysis.

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<sup>1</sup> Sofia University "St. Kliment Ohridski", Faculty of Economics and Business Administration, Sofia, Bulgaria, stanislava.hr.ivanova@gmail.com

<sup>2</sup> Sofia University "St. Kliment Ohridski", Faculty of Economics and Business Administration, Sofia, Bulgaria, iyanchovska@gmail.com



## **USING STEM (SCIENCE, TECHNOLOGY, ENGINEERING, ARTS, AND MATH) BASED APPROACH IN PROJECT-BASED ENTREPRENEURSHIP EDUCATION AT A TRAINING INSTITUTE**

**Krassimir Mitrev<sup>1</sup>**

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**Abstract:** The education system in the 21st century is continuously transforming due to modern trends in human sciences, particularly the accelerated development of pedagogical science. New approaches are required based on the increased quality of education, personality development, the principles of democratic learning, STEM education, current trends in entrepreneurship education. Ensuring quality professional education and training requires compliance with the European and national priorities and policies in this area. In education systems, the requirement for developing social competencies, qualities of taking initiative and entrepreneurship, personal responsibility and special skills related to business and entrepreneurial activity is increasing.

This article presents a model for combining and upgrading traditional entrepreneurship training with STEM-based training and active learning methods in an interactive educational environment. The aim of the research is to develop an innovative model for entrepreneurship education through a training institute, with the application of STEM based integrated activities. For the study the following tasks have been defined: analysis of the current state of the problem in the scientific literature and a study of good European and national practices for entrepreneurship education, analysis of the didactic aspects of entrepreneurship training through a training institute for students aged between 15-19 years, development of an experimental program for extracurricular activity using active methods and an integrated STEM approach, development of variants of interdisciplinary situations and learning projects combined with STEM. Achieve functional literacy, analytical skills and creativity, rapid adaptation to modern technologies and the resulting changes in the labor market. In parallel, the focus is on the formation of interdisciplinary and practically oriented knowledge and problem-solving skills, entrepreneurship, creative and critical thinking, and civic engagement.

**UDC Classification:** 004.42

**Keywords:** STEM, educational process, innovative approach, critical thinking.

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<sup>1</sup> South-West University "Neofit Rilski" in Blagoevgrad, Republic of Bulgaria,  
kr.mitrevzpg@gmail.com

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## THE EFFECTS OF OUTWARD FOREIGN DIRECT INVESTMENT AND INSTITUTIONAL QUALITY ON ECONOMIC GROWTH

Osarumwense Osabuohien-Irabor<sup>1</sup>, Igor Mikhailovich Drapkin<sup>2</sup>

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**Abstract:** This study examines the interactions of outward foreign direct investment with institutional quality as well as other macroeconomic determinants to determine whether their joint impact promotes home country economic growth. Econometric techniques such as the pooled OLS, fixed effect, differenced Generalized Methods of Moment, and the System Generalized Methods of Moment (GMM) are utilized for panel dataset of 141 countries for the period 2003-2019. The study finds that the dynamic interaction of outward foreign direct investments (FDI) and institutional quality is positive and boosts home country's economic growth and development. Furthermore, evidence shows that the mutual reinforcement of outward FDI and exchange rate gives rise to economic growth. This suggests that when home country's currency appreciates, there may be a higher flow of overseas direct investment to countries with weaker exchange rate, given that the domestic currency can buy more investment. This enhances economic growth through forward and backward linkages. These results imply that policymakers should consider sound economic policies that integrates outward FDI with home country institutions as well as other economic determinants to enhance economic growth.

**JEL Classification Numbers:** F60, F62, F63

**Keywords:** Outward foreign direct investment, economic growth, institutional quality, panel data.

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<sup>1</sup> Graduate School of Economics and Management, Ural Federal University, Yekaterinburg, Russian Federation, oosabuokhien-irabor@urfu.ru

<sup>2</sup> Graduate School of Economics and Management, Ural Federal University, Yekaterinburg, Russian Federation, i.m.drapkin@mail.ru

## **A THREE GENERATIONAL STUDY OF PRODUCT PREFERENCE AND MOTIVATIONS TO PARTICIPATE IN THE SHARING ECONOMY**

**Pavel Pelech<sup>1</sup>**

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**Abstract:** The sharing economy is a trend that is catching the attention of people and companies all over the world. It is expected to replace the traditional model of buying and selling into sharing. However, there is a lack of literature focusing on the relationship between motivational factors and the attitudes of different generations towards the sharing economy and on the type of products different generations are willing to share in a sharing economy. This paper aims to fill this knowledge gap and examine these relevant variables together. With a sample size of 741, the study focuses on the three generations: X, Y, and Z. It was conducted from December 2021 to March 2022. The non-parametric Kruskal-Wallis test and descriptive statistics were used to analyse the collected data. The results of the study revealed that the respondents from different generations are willing to share different assets. Except for only two asset groups, the willingness to share these assets does not depend on the generation of the respondents. The research also indicated that the respondents across different generation have the same motivating factors for participation in the sharing economy. The findings of the study offer valuable insights for the platforms facilitating sharing of unused assets. It will help them to target their marketing communications effectively. Simultaneously, these findings will enhance the theoretical knowledge about the sharing economy with factual information that links it to marketing, as marketing literature concerning the sharing economy is still in its infancy.

**JEL Classification Numbers:** D16, E21, M31

**Keywords:** generation X, generation Y, generation Z, motivation factors, sharing economy.

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<sup>1</sup> Technical University of Liberec, Faculty of Economics, Department of Marketing and Trade,  
pavel.pelech@tul.cz

## **A COMPREHENSIVE STUDY OF THE COVID-19 PREVENTIVE MEASURES AT THE TOKYO 2020 AND BEIJING 2022 OLYMPIC GAMES**

**Anton Siekel<sup>1</sup>, Zuzana Vodáčková<sup>2</sup>, Matej Šebesta<sup>3</sup>, Peter Plavčan<sup>4</sup>**

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**Abstract:** National and international sports are well recognized in the international Olympic movement. The Summer and Winter Olympic and Paralympic Games are the major global sporting events, uniting the entire world together for world peace. Managing the health and safety of athletes at these top sporting events is an important task. During the outbreak of the COVID-19 pandemic, sound organisational policies and effective preventive measures to protect athletes from infection at the Olympic Games were essential. Currently, there is not much information on the spread of COVID-19 infection in sports events and the effectiveness of preventive measures. The present study analyses the preventive measures for COVID-19 at Tokyo 2020 Summer Olympics and the Beijing 2022 Winter Olympics. The study is based on the official documents of the International Olympic Committee and the International Paralympic Committee. It compares the COVID-19 spread and preventive measures taken by the organisers at the Tokyo 2020 Summer Olympic Games and the Beijing 2022 Winter Olympic Games.

**UDC Classification:** 32, 79

**Keywords:** Winter Olympic Games, International Olympic Committee, COVID-19 disease

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<sup>1</sup> Vysoká škola Danubius (Danubius College), Faculty of Public Politics and Public Administration. Richterova 1171, 925 21 Sládkovičovo, Slovak Republic. siekel@olympic.sk

<sup>2</sup> Vysoká škola Danubius (Danubius College), Faculty of Social Studies. Richterova 1171, 925 21 Sládkovičovo, Slovak Republic. vodackova@olympic.sk

<sup>3</sup> Vysoká škola Danubius, Fakulta sociálnych štúdií. Richterova č. 1171, 925 21 Sládkovičovo, Slovak Republic.

<sup>4</sup> Vysoká škola Danubius (Danubius College), Faculty of Social Studies. Richterova č. 1171, 925 21 Sládkovičovo, Slovak Republic. peter.plavcan@vsdanubius.sk

## THE RELATIONSHIP BETWEEN DIRECT INVESTMENT AND GDP IN ROMANIA

Adelina-Andreea Siriteanu<sup>1</sup>

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**Abstract:** According to the general theory, direct investment has many positive effects on the economy of a state. Romania has attracted a growing number of direct investments. Romania's economy is still marked by the transition from a closed to a market economy. Thus, the effects of communism are still felt today. However, it is making every effort to develop and provide its citizens with a better way of life in line with European norms. It is well-known that direct investments in a country creates opportunities for its economy and people. Various empirical studies have analysed the impact of direct investment on the GDP growth of a country. The present study explored the relationship between direct investment and Romania's GDP using bivariate VAR models. Granger causality principle was used to test the hypothesis that the volume of direct investments in the past explains the current GDP values and the current volume of direct investments. The study found that the rising trend in direct investments in Romania leads to the growth of GDP. The estimated VAR models for Romania provide evidence that increasing GDP results in increased direct investments in the country, reinforcing the idea that investors are sensitive to stable macroeconomic conditions. Subsequent research could also include a comparative study with European Union countries or the introduction of other variables such as inflation rate, unemployment rate, labor costs, etc.

**JEL Classification Numbers:** G18, H12, O47

**Keywords:** direct investment, economic growth, GDP, pandemic crisis, Romania

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<sup>1</sup> "Alexandru Ioan Cuza" University of Iași, Doctoral School of Economics and Business Administration, e-mail: siriteanuadelinaandreea@gmail.com, siriteanu.adelina@feaa.uaic.ro

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## SUSTAINABILITY AND THE REASONS FOR ITS ADOPTION IN THE COMPANIES

Stela Zhivkova<sup>1</sup>

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**Abstract:** Sustainable development is all around us nowadays. Every day we are poured in with initiatives and information related to sustainable development. The world leaders talk about the green economy, circular economy, green deals, and sustainable development. However, what actually drives the companies to apply sustainable development principles in their business operations? Whether these are the different legislative requirements at the national and international level or the pure economic interest of the companies to earn additional income from their sustainable actions? The present paper highlights the key results of the project "International Business and Sustainable Practices" and attempts to summarize the motivations for the business to be sustainable. The research focuses on the three key dimensions of sustainability (economic, environmental, and social) and the sustainable development practices of internationally operating companies. The main objectives of the study are to identify the major business environment factors influencing the implementation of sustainable practices by companies operating internationally and to analyze the best sustainable development practices. The present study is primarily desk research based on the review of existing literature for developing and promoting the concept of sustainability in everyday business practices. Research papers, projects, and reports of international organisations working for sustainable development are extensively reviewed. The study found that internal environment factors like managers' attitude, employees, and financial benefits are the key motives for the organisations to apply sustainable development practices in their business operations.

**JEL Classification Numbers:** F23, Q01, Q56, M14

**Keywords:** sustainability, international business, corporate governance

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<sup>1</sup> University for national and world economy, International Economics and Politics faculty, International Economic Relations and Business Department, Sofia, Bulgaria, st\_zhivkova@yahoo.com

## **2 – SOCIAL SCIENCES**

## **RULE ADAPTATION PROBLEMS IN THE COURSE OF MISTAKE CORRECTION (BASED ON A PROFESSIONALLY ORIENTED ENGLISH GRAMMAR COURSE AT UNIVERSITY)**

**Irina A. Bakhmetieva<sup>1</sup>**

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**Abstract:** The paper focuses on a vital issue faced by the English teachers regarding correcting grammatical mistakes, which involves not only identifying, correcting and commenting on mistakes, but also producing a valid and relevant grammar rule, usually modified and different from the prescriptive grammar books. Though this process of correcting mistakes may seem primitive, the research shows that problems arise at the initial stage of mistake identification and tend to have a snowball effect and result into communicative failures if not properly addressed. The main research methods employed are observation, question and answer sessions and written work screening. A total of 243 second-year students' written samples (tests, quizzes, homework exercises) with formulated grammar rules over the period of 2018-2021 as well as their oral answers in class have been analyzed. First of all, the reasons for the students' inability to spot and correct grammatical mistakes are ignorance of the grammatical rules and their inability to match mistakes with a particular grammatical principle. The second reason is students' lack of experience in grasping concepts from English grammar textbooks for teaching schoolchildren. Finally, faulty correction of mistakes is put down to lack of skills to synthesizing grammatical information. To overcome these problems, exercises on grammar rules from authentic textbooks of varying complexity, critical discussions on student presentations aimed at correcting grammar mistakes and introducing the corresponding rules, and role-plays where the aspiring teachers must respond to the students' answers and correct their mistakes are suggested.

**UDC Classification:** 378

**Keywords:** grammar, rules, mistakes, descriptive, prescriptive.

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<sup>1</sup> Voronezh State Pedagogical University, Department of Foreign Languages, irbakh@mail.ru ORCID: 0000-0003-1076-5229



## PROFESSIONAL QUALITY OF LIFE AND BURN OUT AMONG PSYSIOTHERAPISTS IN LATAVIA

Līga Barone<sup>1</sup>, Maija Zakriževska-Belogradova<sup>2</sup>

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### Abstract:

**Background:** In their daily practice, physiotherapists need to physically and emotionally interact with their patients; therefore, like any other helping professionals, are subject to emotional risks. The aim of this study is to explain the symptoms of compassion fatigue (CF) and professional burnout (BO) in Latvian physiotherapists and offer suggestions for the staff management.

**Methods:** To achieve the goal of the study, quantitative, non-experimental research was conducted using: the Professional Quality of Life Scale and the Maslach's Burnout Scale. The present study measures the level of compassion satisfaction (CS), secondary traumatic stress (STS), and Burn Out (BO) syndrome. In addition, the BO was measured along with its three dimensions: emotional exhaustion (EE), depersonalisation (DP), and a reduced sense of personal accomplishment (PA). Convenience sampling was used in the study. The survey was conducted among 155 physiotherapists with an average age of 35.5 years and an average length of service of 9.5 years.

**Results:** The results of the study show that physiotherapists have moderate Compassion Fatigue ( $M=36,37\pm 7,23$ ), low Secondary Traumatic Stress ( $M=27,54\pm 4,65$ ), and moderate Burn Out ( $M=17,68\pm 6,89$ ) (only EE dimension had a high value ( $M=24,52\pm 12,84$ ), but moderate Depersonalisation P ( $M=7,3\pm 6,06$ ) and low Personal Accomplishment ( $M=38,92\pm 6,49$ ). Statistically significant correlations are found between all these phenomena. Furthermore, statistically significant differences in these phenomena among physiotherapists with different length of service are also confirmed.

**Conclusions:** The study demonstrates the association between CF, STS, and BO symptoms and their variability over a physiotherapist's length of service. Under the influence of these emotional risks, 60% of respondents reported a lack of compassion satisfaction to continue working as a physiotherapist.

**UDC Classification:** 615,8

**Keywords:** Burn out, Compassion fatigue, Secondary Traumatic Stress, Physiotherapy

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<sup>1</sup> RISEBA University of Applied Sciences, Riga, Latvia, barone.liga@gmail.com, ORCID: 0000-0003-1810-1881

<sup>2</sup> RISEBA University of Applied Sciences, Riga, Latvia, maija.zakrizevska@riseba.lv, ORCID: 0000-0002-8570-5469

## PARENTAL CONTROL OVER MEDIA CONSUMPTION IN SLOVAK FAMILIES

Kristína Bielčíková<sup>1</sup>

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**Abstract:**

**Introduction:** A child's upbringing begins with his/her birth as he/she gradually adapts to the current family habits and society, so that the child is prepared for all circumstances. From birth, a child perceives the warmth, the light, and the love of his/her mother. They also perceive the influence of the media, and it is, therefore, desirable to prepare children to use them correctly and safely. Children use several types of media as a source of information, entertainment, and leisure.

**Objectives:** The study aims to identify and analyse adolescents' media consumption and to highlight parental control in Slovak families.

**Methods:** the data for the study is conducted with an online questionnaire focusing on media literacy and parental mediation, which is then distributed among the pupils in Slovakia.

**Results:** The study finds that boys spend most of their time on the computer or laptop, and the most common activity is playing games. Connecting to social networking sites for chatting is popular among girls. The use of mobile phones with internet access is common among both genders. Boys are found to have more restrictions on the time spent online and the content consumed. Age wise, media consumption of 11 and 12 year olds is restrictive. For older pupils, there is not much parental control.

**Conclusion:** Media literacy is important for families today. Parents must adapt to the digital age and equip their children to use online media responsibly. The study highlights the possibilities for family media education and draws attention to age and gender-wise differences in the parental control on media consumption of adolescents in Slovak families.

**UDC Classification:** 37

**Keywords:** Parents, Media, Adolescent, Control, Slovakia

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<sup>1</sup> Constantine the Philosopher University, Pedagogical Faculty, Department of Pedagogy, Nitra, Slovakia, kristina.bielcikova@ukf.sk, <https://orcid.org/0000-0002-6801-1254>

## PERSONNEL LOYALTY, WORK-LIFE BALANCE DURING REMOTE WORK

Solveiga Blumberga<sup>1</sup>, Santa Berga<sup>2</sup>

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**Abstract:** Nowadays, loyalty is rooted in an employee's commitment to the organisation and involvement in its activities and is described as a belief in organisational goals and values. However, when the Covid-19 pandemic overwhelmed not only Latvia but the whole world, it became crucial to find out how personnel felt at a time when their office to home (where before 2019, all the work-related stress was left behind) and when the world was restricted to homes. While working remotely from home instead of office, the work-life balance gets easily disturbed. The present study attempts to answer the following questions: What type of loyalty does predominate among employees working remotely? What factors affect the work-life balance of the employees during remote working? Is there any correlation between personnel loyalty and work-life balance during remote working? Findings of various studies on loyalty, work-life balance, types of remote work, and its advantages/disadvantages, with an emphasis on work-life balance during remote working, are summarised in this article. Two surveys were conducted for the study: a survey on loyalty to the organisation and a survey on work-life balance during remote working. The study involved 103 full-time employees from the manufacturing industry who performed their work remotely. Results of the study show that employees represent a vital resource, and remote working is one of the new forms of employment created by digitalisation that will steadily enter and take root in the labour market. The main problems highlighted by the results of the study includes the workload, which most directly affects the work-life balance and has been noted by 70% of the respondents; the lack of managers' understanding; and employers' negative attitude towards the staff absence. The results of the study highlight the need for more detailed research on remote working, and for development of guidelines or recommendations on promoting a work-life balance.

**UDC Classification:** 331.1

**Keywords:** loyalty, personnel, remote working, work-life balance, pandemic, COVID-19.

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<sup>1</sup> RISEBA University, Business Department, Riga, Latvia, solveiga.blumberga@riseba.lv

<sup>2</sup> RISEBA University, Riga, Latvia, santaberga22@gmail.com

## INDICATIONS FOR DANCE THERAPY IN SOCIAL WORK

Jozef Granec<sup>1</sup>, Hermína Mareková<sup>2</sup>

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**Abstract:** The present study analyses the therapeutic use of dance in social work, particularly the possibilities of using Argentine tango. Through dance, contacts are made, communication happens, and feelings are shared. It is wrong to perceive dancing as fun rather than one of the vital human needs. Dance is one of the binding forces holding people together that, despite all the differences, can prevent society from falling apart. Dance has the power of overcoming what otherwise is difficult; even without using drugs, it can reduce anxiety. The rediscovery of dance, the use of dance movements, and music in social work brings new possibilities. However, these possibilities depend upon certain skills and the broader perspective of a dance therapist. The research aims to summarise and synthesise information from various sources, especially from the medical field. The study focuses on the possible indication of dance therapy, and its elements that could draw more attention to this hitherto unexplored therapy. It is also the pioneering research in this area.

**UDC Classification:** 304

**Keywords:** therapy, social work, dance, Argentine tango, indication

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<sup>1</sup> Danubius University, Sládkovičovo, Slovakia, hermina.marekova@gmail.com

<sup>2</sup> Danubius University, Sládkovičovo, Slovakia, dodogranec1@gmail.com

## **PARENTAL ATTITUDES AND EXPECTATIONS AS A DETERMINANT OF CHILDREN'S SUCCESS IN SCHOOL**

**Libuša Gužíková<sup>1</sup>, Eleonóra Mendelová<sup>2</sup>**

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**Abstract:** One of the determining factors of a child's success in school is the parents' attitude towards it, and the level of parents' expectations from their child. The study explores the parent's attitudes toward a child's success in school and their expectations from them. The present study is based on reviewing the relevant literature on the topic and synthesising the key findings. The results of the study show that parents' attitudes and expectations towards the school success are determined by their education level and the importance of education in the family. The findings indicate that parents' positive attitudes towards education and the child are indicators of a child's success in school. Parents' higher expectations and aspirations were manifested in the highly educated families with higher socioeconomic status.

**UDC Classification Numbers:** 316.36, 316.7

**Keywords:** school success, parents' attitudes, parents' expectations, education, socioeconomic status.

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<sup>1</sup> Constantine the Philosopher University in Nitra, Department of Pedagogy, Faculty of Education, libusa.guzikova@ukf.sk

<sup>2</sup> Constantine the Philosopher University in Nitra, Department of Pedagogy, Faculty of Education, emendelova@ukf.sk

## THE ARCHITECTURE OF A STANDARDISED MATHEMATICAL CREATIVITY TEST FOR DEVELOPMENTAL EVALUATION

**Geanina Havârneanu<sup>1</sup>**

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**Abstract:** This paper aims to analyse the architecture of a longitudinal assessment tool used in a strategic project to develop mathematical creativity involving *ex-ante*, *in itinere*, and the *ex-post* assessment sessions.

This analysis envisages the curriculum vision of the creativity test, the teleological configuration, the types of competencies to achieve, and the operational objectives of the evaluation. The matrix explaining the operational objectives with the objectives of the creativity test, design, pretesting, and the statement of each item is discussed. The table explaining correspondence between items and the objectives of the scale are elaborated with the correction scheme and the grading scale. The difficulty and discrimination coefficient for each item are calculated, and the evaluation criteria of the overall qualities (objectivity, applicability, fidelity, and validity) is explained.

**UDC Classification:** 37.01

**Keywords:** developmental evaluation, table of specifications, difficulty coefficient, discrimination coefficient, qualities of a standardized test.

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<sup>1</sup> Al. I. Cuza University of Iași, Romania, Faculty of Psychology and Educational Sciences, Department of Education Sciences, geanina.havarneanu@uaic.ro

## THE HYMNONYM 'SONG' – A ROOT WORD IN BULGARIAN AND RUSSIAN PHRASEOLOGY

**Teodora G. Ilieva<sup>1</sup>**

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**Abstract:** The present article deals with the hymnonym of 'song' as a root word in 17 phraseological microsemantic cores in Bulgarian and Russian languages, excerpted from many phraseological dictionaries and media texts. The taxonomic material, the basis for the semantic-syntactic analysis belongs to a wider phrase field – of real (full) phraseological units and non-real phraseological expressions. A comparison is between the phrases in the two languages, highlighting the common Slavic uses and differences, the specific expressions (direct, metaphorical, metonymic, and other uses of 'song'), which are the linguistic picture of each ethnic phenotype. I analyze and categorise the phraseologisms on several grounds according to their syntactic structure (bi-element: A + S, V + S, S + S; three-element: V + A + S, S + pr + S, V + Pron. + S; poly-element: V + A + c + A + S, V + pr + S + Pron, V + pr + S + A + S, V + comp. + A + S, pr + S + S + V).

**UDC Classification:** 811.16

**Keywords:** hymnonyms, concept song, linguistic parallels, ethno-specificities, phraseological structure

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<sup>1</sup> Faculty of education, Trakia University, Stara Zagora, Bulgaria, ilievat\_@abv.bg. ORCID:  
<https://orcid.org/0000-0002-5100-2984>

## WHY NATO-RUSSIA COUNCIL HAS FAILED AFTER 20 YEARS OF EXISTENCE

Raluca Iulia Iulian<sup>1</sup>

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**Abstract:** At the end of 2021, Russia mobilised over a hundred thousand soldiers along its border with Ukraine constituting a permanent threat to Ukraine and a concern for the West and the whole world. On February 24, 2022, Russia initiated a military intervention in Ukraine. The Kremlin has decided to reconstitute its border lines of the former USSR (Union of Soviet Socialist Republics) and its spheres of influence in Central and Eastern Europe.

After the end of the Cold War, Russia, a nuclear power, has constantly expressed its desire to have a special status in relation to the North Atlantic Alliance different from that of former communist countries, members of the Warsaw Pact. The NATO-Russia Council (NRC) is the structure in which Russia had that special and unique relationship with NATO. NRC was established in 2002 to resolve any inconsistencies in the NATO-Russia relations, to facilitate a more flexible dialogue, and understanding between the parties and to open new areas of collaboration. However, it could not change the perceptions created during the Cold War, and most importantly, it could not resolve Russia's place and role in Europe's security issues.

From February 24, 2022, the NRC lost its credibility, the policy of dialogue was no longer relevant and NATO switched to the policy of deterrence and collective defense of the entire Eastern flank of NATO.

The study presents the evolution of relations between NATO and Russia, the phases they went through in the last twenty years since the creation of the NRC and explained the failure of NATO-Russia cooperation in NRC.

**UDC Classification:**327.5

**Keywords:**NRC, poles of power, security cooperation

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<sup>1</sup> University Politehnica of Bucharest, iri\_2015@yahoo.ro



## **EVALUATION OF STUDENTS' OPINION ON THEIR INVOLVEMENT IN THE ELECTORAL PROCESS IN KOSOVO**

**Arian Besnik Kadriu<sup>1</sup>, Ekaterina Marmilova<sup>2</sup>**

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**Abstract:** The study explores the possibilities of increasing the involvement of young voters in the electoral process. It assesses the involvement of youth in the electoral process based on the responses of students majoring in Political Science and Jurisprudence in Kosovo. In-depth interviews were conducted as it is believed that the students in these areas are novice experts in the field of political science and jurisprudence. The research was conducted at UBT College is based in Prishtina, where students from different municipalities attain their higher education. It helps in identifying general trends in the country. The total number of students in each course is 80, every second student took part in the in-depth interview. As a part of the study, it is required to confirm whether the demographic characteristics of respondents influence their participation in elections. The results of the study showed that majority of the respondents were females, in the age group of 18-24 years, currently living in Pristina and are studying at the university. In Kosovo there is a high involvement of youth in the elections (57.5%), students participating in elections strive to change the future of their country (34.8%). However, it is possible to increase voters' turnout among youth by increasing their interest in elections (23.6%), aligning party programs and candidates with the political interests of the voters (17.5%), and by considering the reasons why the voter cannot come to the polling station on the election day (11.8%). Conclusions: The results indicate high electoral activity among youth. In view of the findings, there is an opportunity to increase the involvement of young voters in the electoral process, and to increase voters' turnout rate among young people in Kosovo. The results of the study in Kosovo are compared with the results of a similar research in Russia. It is believed that in Kosovo youth participation in elections is seen as an opportunity to influence political decisions, bring changes in the political course of the country. The study also concludes that participation in elections is influenced by demographic characteristics of the respondents. It is identified that in future, no successful party can afford to neglect the category of young and female voters.

**UDC Classification:** 324

**Keywords:** voter turnout, elections, electoral process, Kosovo, involvement of voters, legitimacy, absenteeism

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<sup>1</sup> UBT-College of Kosovo, Prishtine, Kosovo, arian.kadriu@ubt-uni.net, <http://orcid.org/0000-0001-5283-6676>

<sup>2</sup> The Higher School of Economics in St. Petersburg, Russian Federation, emarmilova@hse.ru, <http://orcid.org/0000-0001-5775-6018>

## **ALGORITHM AND PARAMETRIC PROGRAM FOR PROCESSING CHAIN WHEELS**

**Tsvetan Kaldashev<sup>1</sup>**

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**Abstract:** The article deals with developing a parametric (macro) program for processing a chain wheel for bush-roller chains. The parametric program is developed for CNC Fanuc and implemented in the production process for the chain wheel family. To develop the parametric program, the dependences for constructing the tooth profile are used: chain pitch and a dividing diameter of the chain wheel, etc. The basic geometrical parameters for processing the chain wheel are set as input data at the beginning of the control program. Based on this information the automatic determination of the coordinates from the trajectory of the tool is performed. The trajectory coordinates are determined for one interdental, where for processing the next ones are used commands, characteristic of the parametric programming, with which the processing algorithm is organised. The machining algorithm can be organised using two approaches: recalculating the initial machining angle and the command to rotate the working coordinate system G68. The first approach is universal because the CNC generation does not influence it, i.e., it applies to both modern and traditional- CNCs, while the second applies to modern CNCs or those supporting the G68 command. The parametric program was tested virtually using the Vericut software, where the basic geometric parameters of the sprocket were tested with its dimensional measurement capabilities.

**UDC Classification:** 621.9

**Keywords:** parametric program, macro program, chain wheels, machining, CNC.

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<sup>1</sup> Faculty of Industrial Technology, Technical University of Sofia, Bulgaria, kaldashev.cvetan@abv.bg

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## ROTARY BROACHING - TECHNOLOGY, APPLICATION AND CAPABILITY

Tsvetan Kaldashev<sup>1</sup>

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**Abstract:** The present paper presents a relatively new technology called rotary broaching for processing external and internal profile surfaces –. The technology can be implemented on lathes (turning centers, multi-task machines) and milling machines with CNC, using a special holder with a tool having the geometry of the processed profile surface installed on it. The tool holder has a specific geometry, providing an angular location of the tool axis relative to the machined surface of  $1^\circ$ , offering the possibility of machining. One of the main advantages of this technology is that it allows the processing of profile surfaces in blind holes and closed external surfaces, for example, on the steps of rotating parts. It requires preliminary preparation of the treated surface, where for internal profile surfaces, it is necessary to process a starting hole with a certain diameter and length, depending on the size of the profile surface. Furthermore, processing by this technology implies obtaining high productivity, as it works with feed for a speed of  $0.01 \div 0.12$  mm/rev and spindle speed (workpiece)  $1000 \div 3000$  min<sup>-1</sup> depending on the processed material. According to the manufacturers of tools used for a rotary broach, various types of material with tensile strength  $R_m$  up to  $1400$  N / mm<sup>2</sup> can be processed, such as stainless steel, cast iron, aluminum and copper alloys, titanium, brass, and others.

<https://www.aeaweb.org/econlit/jelCodes.php?view=jel> UDC Classification: 621.9

**Keywords:** CNC, rotary broaching, toolholder, cutting tool

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<sup>1</sup> Faculty of Industrial Technology, Technical University of Sofia, Bulgaria, kaldashev.cvetan@abv.bg

## NEW POSSIBILITIES OF SOCIAL WORK IN THE 21ST CENTURY

Hermína Mareková<sup>1</sup>

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**Abstract:** The present study aims to map some critical aspects of social work in the 21st century, especially when participants in the old social assistance system are facing difficulties in the old system. Integration or reintegration of individuals back into society often becomes discriminatory. It is outdated and not accessible to everyone in need. This unresolved issue has been discussed as a large number of patients cannot be discharged from the hospital simply because they have nowhere to go or their home environment is unsatisfactory. Even the idea of providing comprehensive care to patients in a hospital setting is not possible. There are few professionals in hospitals. In the hospital, even if sufficient care is provided, the reintegration of the patients into the society or their families is not possible, which would mean the success of this therapy. This situation can be solved by using a multidisciplinary approach, as the biological, psychological, and social aspects must be considered to solve it. The study deal with the most important tasks in the context of social care in selected areas.

**UDC Classification:** 304

**Keywords:** social work, rehabilitation, social care

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<sup>1</sup> Danubius University, Sládkovičovo, Slovakia, hermina.marekova@gmail.com

## NEW DIRECTIONS OF USING MUSIC THERAPY IN SOCIAL WORK

Hermína Mareková<sup>1</sup>

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**Abstract:** The innovative therapies that have existed for a long time in the field of social work globally are still not used in Slovakia to the extent that their visible benefits could be assessed. It is only at the stage of isolated activities of some enthusiastic social workers. Despite the emerging theoretical considerations about the possibilities of achieving better results in social care, there are some rigid opinions and professional “jealousy” on the part of some disciplines, especially medical, that social work has no competence as therapy. The study focuses on music therapy as a possible therapeutic direction in the social field. Even though it is mainly used in psychotherapy, there is also room for it in social work. The best argument to support this is the time factor because health professionals, psychologists, and psychiatrists can only devote a limited time to their clients, compared to a social worker, who is present all the time in the social services facility, even without waiting. An active or passive relationship with music can give an individual a comprehensive experience; therefore it is used as a therapy. The present study elaborates on the protocol for implementing music therapy in Slovakia. The results from the pilot study revealed that apart from utilisation of stress-relieving music, the knowledge about music therapy is shallow. It led to mapping the present status of music education and possibilities of using it as therapy. The introductory part of such studies requires theoretical preparation, a literature review and theoretical grounding of the topic.

**UDC Classification:** 304

**Keywords:** art therapy, science, social work, medicine, music therapy, music therapist, brain plasticity

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<sup>1</sup> Danubius University, Sládkovičovo, Slovakia, hermina.marekova@gmail.com

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## SELECTED SPECIFICS OF CRISIS AND DISASTER PSYCHOLOGY

Andrea Pastuchová Neumannová<sup>1</sup>

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**Abstract:** The present study uses the terms disaster, crisis, and emergency, these situations cause threats to life, health, and property. Disasters, crisis, and crisis phenomena, trauma, PTSD are briefly characterised in the study. It also studies vulnerability of intervening rescuers, emphasising post-traumatic care, and crisis intervention as an effective psychosocial support tool for the victims and IRS professionals after the disaster. Based on the content and comparative analysis of relevant information, regulations, available literature, and other sources, the present comprehensive study is prepared for scientific research; other research methods are also used in the study.

The goal of the study was to map the trends in disaster occurrence, analyse the most common form of the disaster, and disaster management techniques relevant to Slovak Republic. In addition, the study presents selected crisis intervention techniques used by rescue professionals during a disaster.

The study mapped the disasters in Presov region in the Slovak Republic in 2020. It was found that the number of floods during the period increased from 147 to 389 compared to 2019. The Presov region in the territory of Slovakia is a disaster-prone area, frequently hit by disasters. The most common disaster affecting the region is the flood. In further studies, the authors are interested in analysing the occupational hazards of firefighters and police officers. The "Guidelines: psychosocial support for uniformed workers," the first European directive for providing effective psychosocial support to the rescuing paramedics after disasters, terrorism, and other emergencies, are considered important for the study. Psychologists from the Ministry of Interior of the Slovak Republic actively provide crisis intervention, "post-traumatic intervention teams" have been established in the Slovak Republic using CISM (Critical Incident Stress Management) baseline methodology.

**UDC Classification:** 159.98

**Keywords:** crises and disaster psychology, psychosocial support, trauma

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<sup>1</sup> Academy of the Police Force in Bratislava, Department of Social Sciences, Slovakia,  
andrea.neumannova@akademiapz.sk

## **MIGRATION MANAGEMENT IN EDUCATION: TRAINING OF THE HEADS OF EDUCATIONAL INSTITUTIONS AT A BORDER UNIVERSITY**

**Aleksandra Shestakova<sup>1</sup>, Lyudmila Sukhorukova<sup>2</sup>, Maksim Ivchenko<sup>3</sup>, Nikolay Fokin<sup>4</sup>,  
Tatiana Shestakova<sup>5</sup>**

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**Abstract:** Migration has actualised the problems in the education of migrants and refugees' children. Therefore, training of the heads of educational institutions at the border territories is required for the migration management in educational institutions. The study presents a model of management training in a cross-border Federal university. The proposed model is based on the competence and personality-oriented approaches in education in Russia and abroad. The data for the study was collected through observation and semi-structured interviews with open-ended questions. The development of the model was supported by a set of developed educational programs for master's degree and additional professional courses. The effectiveness of scientific and methodological educational software has been experimentally proven during the in-depth interviews. The results of the study contribute to the development of heads and teachers training and curricula. These results are used in the continuing professional educational programs, development of managerial and teaching staff in the field of education, in pre-professional education, and various special courses and training programs for the students of pedagogical specialties. In conclusion, the study develops a vision for the further development of the system for training managerial and pedagogical personnel in education for migration management in education.

**UDC Classification:** 378

**Keywords:** migration, leadership, master's degree program.

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<sup>1</sup> Southern Federal university, Academy of psychology and pedagogy, Rostov-on-Don, Russian Federation, ashestakova@sfedu.ru

<sup>2</sup> Southern Federal university, Academy of psychology and pedagogy, Rostov-on-Don, Russian Federation, lsukhorukova@sfedu.ru

<sup>3</sup> Southern Federal university, Academy of psychology and pedagogy, Rostov-on-Don, Russian Federation, mvivchenko@sfedu.ru

<sup>4</sup> Southern Federal university, Academy of psychology and pedagogy, Rostov-on-Don, Russian Federation, nfokin@sfedu.ru

<sup>5</sup> Southern Federal university, Academy of psychology and pedagogy, Rostov-on-Don, Russian Federation, tshestakova@sfedu.ru

### **3 – MEDICINE AND PHARMACY**



## **DEVELOPMENT OF A MODEL FOR THE PREVENTION OF AGEISM IN NURSING PRACTICE IN A TEAM WITH SOCIAL GERONTOLOGIST**

**Ana Marija Hošnjak<sup>1</sup>, Jana Goriup<sup>2</sup>**

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**Abstract:** One key characteristics of professionalism is acquiring new knowledge based on the evidence-based development of innovative models and their practical implementation. The present study describes the development of a multidisciplinary model with a social gerontologist at its center, called the Model of Ageism Prevention in Nursing Practice. It considers the role of a social gerontologist in the most dominant demographic phenomenon of aging population. The developed model gives an overview of the current situation, explains the theories on which the conceptual framework is based, discuss some key criticisms and offers solutions. Implementing the Model of Ageism Prevention in Nursing Practice aims to strengthen the multidisciplinary team, modernise nursing, and raise standards of nursing care. Recent literature has been analysed and synthesised to develop this theoretical model for preventing ageism in nursing. The education of nurses, on the one hand, and the intergenerational contacts of the beneficiaries, on the other hand, are successful in preventing age discrimination after identifying critical points. The model explains the role of the social gerontologist as a link that connects these relationships. The development of these concepts will increase the satisfaction level of the health care users with the satisfaction from nursing care, consequently improving the quality of nursing care. Most importantly, nurses can reduce prejudice against older people and take preventative measures once they know the existing problem. The ageism prevention model seems appropriate for educational curriculum creators and national programs. Future studies are expected to validate the model and improve it. It is suggested that the guidelines of the Model of Ageism Prevention can be used as the starting point for developing a national program to prevent age discrimination in practice.

**UDC Classification:** 316:61

**Keywords:** ageism, model implementation, nurse, social gerontologist.

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<sup>1</sup> University of Applied Health Sciences, Department of Nursing, 10000 Zagreb, Croatia, anamarija.hosnjak@zvu.hr. ORCID:0000-0002-0083-3104

<sup>2</sup> Alma Mater Europaea-ECM, Department of Social gerontology, 2000 Maribor, Slovenia, jana.goriup@almamater.si.

## OCCUPATIONAL BURNOUT SYNDROME AMONG COMMUNITY PHARMACISTS DURING COVID-19 PANDEMIC

Mariya Ivanova<sup>1</sup>, Anna Todorova<sup>2</sup>, Magdalena Pesheva<sup>3</sup>

### Abstract:

**Introduction:** The community pharmacy is the most accessible medical facility in the current healthcare system. Therefore, the expectations from pharmacists as the most accessible healthcare professionals are constantly rising. However, various studies indicate that pharmacists are subject to very high levels of occupational stress and professional burnout is common.

The COVID-19 pandemic has posed new challenges to the work organisation in pharmacies and demand for an adequate reorganisation. In addition, it forced pharmacists to quickly adapt to the new circumstances and requirements and further increased occupational stress.

**Objective:** To establish the level of occupational burnout among community pharmacists during COVID-19.

**Materials and Methods:** An anonymous questionnaire survey was conducted among 127 pharmacists working in community pharmacies in Varna, Bulgaria. The study period was from March 2021 to October 2021. The questionnaire consisted of two parts; the first one was based on the specialised Maslach Burnout Inventory (MBI-HSS) tool, assessing professional burnout in terms of emotional exhaustion, depersonalisation, and personal accomplishment; the second one collected data about the demographic characteristics of the respondents, including their job position, pharmacy type (an independent pharmacy or a pharmacy chain) and information on specific problems during COVID-19.

**Results:** The identified mean values in the group of respondents were as follows: emotional exhaustion  $M=23.39$  ( $SD\ 9,298$ ), depersonalisation  $M=12.37$  ( $SD\ 6,426$ ), professional achievements  $M=31.25$  ( $SD\ 7,531$ ). The sample mean values that stood out were in the depersonalisation scale  $M=12.37$ , which is considered a high value. A statistically significant difference was found in the different age groups on the depersonalisation scale ( $F=3,957$ ,  $p=0,022$ ). There was a statistically significant difference between the arithmetic mean values for the age groups 25-40 years ( $M=13.75$ ) and over 55 years ( $M=9.86$ ).

**Conclusion:** Based on the statistical differences for depersonalisation among pharmacists in different age groups, it can be concluded that young pharmacists do not express empathy while providing pharmaceutical care services.

**UDC Classification:** 615.1

**Keywords:** burnout, pharmacists, community pharmacy, COVID-19

<sup>1</sup> Department of Organization and Economics of Pharmacy, Faculty of Pharmacy, Medical University of Varna, Bulgaria, M.M.Ivanova@mu-varna.bg

<sup>2</sup> Department of Organization and Economics of Pharmacy, Faculty of Pharmacy, Medical University of Varna, Bulgaria, anna.todorova@mu-varna.bg

<sup>3</sup> Department of Organization and Economics of Pharmacy, Faculty of Pharmacy, Medical University of Varna, Bulgaria Magdalena.Pesheva@mu-varna.bg

## IMPACT OF STRESS ON HEART RATE VARIABILITY

Penio Lebamovski<sup>1</sup>

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**Abstract:** The present article traces the impacts of stress on Heart Rate Variability (HRV). The stress can be caused either through sports or a 3D serious game that simulates real life situations. The study aims to perform an analysis and evaluation of HRV in both cases. One approach is to track the impact of running on HRV. It has been found that sport increases HRV by increasing sympathetic activity. At the same time, it has been proven that professional athletes and special forces have both a high sympathetic tone and a higher parasympathetic tone than ordinary people. Another approach to a stressful situation is through Virtual Reality (VR). Not everyone can be subjected to physical exertion for various reasons; therefore the use of virtual reality in medical diagnosis is important. Two virtual reality systems can be used in medical diagnosis: systems with and without immersion. Science has proven that the greater the immersion in virtual reality, the greater the sympathetic tone. Therefore, the sympathetic tone is most active in VR immersion systems such as Head Mounted Display (HMD).

**UDC Classification:** 616.1

**Keywords:** HRV, HMD, Poincare plot, running athletes, VR

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<sup>1</sup> Bulgarian Academy of Sciences, Institute of Robotics, Bulgaria; p.lebamovski@abv.bg, penko\_13a@abv.bg

## THE CLINICAL ENVIRONMENT AS A SOURCE OF STRESS AMONG BACHELORS OF MEDICAL SPECIALTIES

Monika Obreykova<sup>1</sup>

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**Abstract:**

Purpose: The fundamental goal of medical education is to train knowledgeable and capable medical professionals. However, the heavy workload during the learning process and clinical practice can sometimes negatively impact students' mental health. This research paper aims to draw attention to the stress-causing factors and strategies for coping with stress during the clinical practice of nurses, midwives, and medical assistants. An online survey was conducted to study the opinion of 100 students of medical specialties from the Department of Health Care, University "Prof. Dr. Asen Zlatarov", Burgas, during their clinical practice in four private and public hospitals in the city of Burgas. The research was conducted in November-December 2021. The results of the study reveal that stress factors significantly predict the mental health of undergraduate students in medical specialties and can cause health problems and adverse situations. The study outlined the main challenge in medical education as the establishment of methods that ignore the students' insecurities and suggests strategies for dealing with stress. Furthermore, the fears that cause stress among students about the activities performed during clinical practice were illustrated. Finally, the study found that many dynamic experiences influence the well-being of undergraduate students in medicine during their clinical practice. The findings of the study will allow the cultivation of professional endurance in patient care.

**UDC Classification:** 614.2

**Keywords:** stress, coping strategies, clinical practice, bachelors in medical specialties

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<sup>1</sup> University "Prof. Dr Asen Zlatarov ", Department of Health Care, Burgas, Bulgaria,  
monika\_obreykova@abv.bg

## **SPATIAL AND TEMPORAL DISTRIBUTION OF NITRATES AND NITRITES IN THE FARMS' WATER OF TIMIS COUNTY, ROMANIA: A CASE-STUDY**

**Cristina Petrescu<sup>1</sup>**

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**Abstract:** The present study aimed to investigate the spatial and temporal distribution of nitrates and nitrites in the farms' water of Timis County. The sample for the study consisted of 4028 analysis bulletins of the nitrate and nitrite concentrations, measured in 41 farms and local water sources over two years (2016- 2242 and 2017- 1904 water samples) by the Surveillance Service, Public Health Direction, Timis. The data has been analysed with an observational case study of the spatial and temporal distribution of nitrate and nitrite concentrations in the farm water in Timis County. It has been found that the mean concentrations of nitrite and nitrate were lower than the standards, with a statistically significant difference ( $t=8.11$ ,  $\text{Sig}<0.001$ ) between the 2 years of study and with higher values recorded in 2016 than in 2017. A specific spatial distribution of the mean concentrations of these two substances was slightly high in old, polluted localities and pig farms in Timis County.

**UDC Classification Numbers:** 614.7, 628.1

**Keywords:** farms' water, nitrates, nitrites, spatial and temporal distribution, case-study.

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<sup>1</sup> „Victor Babes“ University of Medicine and Pharmacy Timisoara, Medicine Faculty, Department 14 Microbiology, Hygiene, Timisoara, Romania, cpetrescu64a@yahoo.com

## **4 – NATURAL SCIENCES AND ICT**

## AN INNOVATIVE TECHNOLOGY FOR PRODUCTION OF AXIAL INDUCTION MOTOR

**Konstantin Kamberov<sup>1</sup>, Georgi Todorov<sup>2</sup>, Tsvetozar Ivanov<sup>3</sup>**

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**Abstract:** This study presents the latest technology to produce axial induction motors for application in electric vehicles. A review of current state-of-the-art technology is performed on the solutions with soft magnetic powder core or machined parts that are not appropriate for mass production. Therefore, new technology is proposed, based on analyzed production technologies specifics. It involves use of a standard metal strips to make both stator and rotor cores. This design includes a spirally wound strip of magnetically conductive material and stacked trapezoidal lamellas. The trapezoidal lamellae are cut using waste-free technology for e.g., guillotine, without specialized punches as in traditional engines. As a result, metal cutting operations are significantly simplified and require widely used production equipment in the industry. The developed technology is appropriate for mass production due to its relatively low cost and eases adaptability. The proposed design is at the physical prototyping and testing stage. Thus, it will be validated by testing the physical prototype in the real industrial environment. This innovative technology is patented and currently under commercialization.

**UDC Classification:** 621.7

**Keywords:** Technology, Innovation, Axial, Induction, Motor.

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<sup>1</sup> Technical University – Sofia, Faculty of Industrial Technology, Department of Manufacturing Technology and Machine Tools, [kkamberov@tu-sofia.bg](mailto:kkamberov@tu-sofia.bg), ORCID: 0000-0001-7985-2609

<sup>2</sup> Technical University – Sofia, Faculty of Industrial Technology, Department of Manufacturing Technology and Machine Tools, [gdt@tu-sofia.bg](mailto:gdt@tu-sofia.bg)

<sup>3</sup> Technical University – Sofia, Faculty of Industrial Technology, Department of Manufacturing Technology and Machine Tools, [tsivanov@tu-sofia.bg](mailto:tsivanov@tu-sofia.bg)

## IN VITRO STUDY OF ANTIMICROBIAL ACTIVITY OF COMMERCIAL ESSENTIAL OILS OF THE LAMIACEAE FAMILY AGAINST STAPHYLOCOCCUS AUREUS ATCC 29213, ESCHERICHIA COLI ATCC 25922 AND CANDIDA ALBICANS ATCC 10231

Yordanka Mihaylova<sup>1</sup>, Neli Ermenlieva<sup>2</sup>, Sylvia Stamova<sup>3</sup>, Silviya Mihaylova<sup>4</sup>,  
Emilia Georgieva<sup>5</sup>, Antoaneta Tsvetkova<sup>6</sup>, Kalina Georgieva<sup>7</sup>

**Abstract:** The aim of this study is to evaluate the potential antimicrobial activity of four commercial essential oils: *Thymus vulgaris* and *Origanum vulgare* (two for external use and two for internal one). The antimicrobial activity of the tested essential oils was determined by using the serial two-fold dilutions method. The following bacterial and yeast strains were purchased and used in the study: *E. coli*, *S. aureus*, and *C. albicans*. The minimal inhibitory concentration (MIC) of Thyme oil (external use) against *E. coli*, and *C. albicans* was 2 µg/ml and 4 µg/ml, respectively. The observed minimum bactericidal concentration (MBC) for Thyme oil (external use) against *S. aureus* was 8 µg/ml. The Thyme oil for internal use demonstrated higher antimicrobial activity than the topical form. The evaluated MBC against *S. aureus* was 4 µg/ml, and for *E. coli*, and *C. albicans*, it was even lower than 1 µg/ml. While determining the MBC of Oregano oil (external) against *S. aureus*, *E. coli*, and *C. albicans*, antimicrobial activity is reported as : 16 µg/ml against *S. aureus*, 4 µg/ml for *E. coli* and 32 µg/ml against *C. albicans*. Also, the observed antimicrobial activity of Oregano oil for internal use is higher than external form – 2 µg/ml against *S. aureus* and lower than 1 µg/ml for the other pathogens. The results of MIC and MBC determination of Thyme and Oregano oils showed that *E. coli*, *S. aureus* and *C. albicans* demonstrate high sensitivity and can be used in therapeutic practice, and some of them probably in combination with other antimicrobial agents.

**UDC Classification:** 579.6

**Keywords:** antimicrobial activity, Lamiaceae, essential oils, MIC, MBC

<sup>1</sup> Medical University Varna, Medical College, Varna, Bulgaria, jordanka.mihaylova@mu-varna.bg

<sup>2</sup> Medical University Varna. Faculty of Medicine, Department of Microbiology and Virology, Varna, Bulgaria, Neli.Ermenlieva@mu-varna.bg

<sup>3</sup> Medical University Varna, Faculty of Pharmacy, Department of Pharmaceutical Chemistry, Varna, Bulgaria, Silvia.Stamova@mu-varna.bg

<sup>4</sup> Medical University Varna, Medical College, Varna, Bulgaria, silviya.mihaylova@mu-varna.bg

<sup>5</sup> Medical University Varna, Medical College, Varna, Bulgaria, emiliya.georgieva@mu-varna.bg

<sup>6</sup> Medical University Varna, Medical College, Varna, Bulgaria, antoaneta.tsvetkova@mu-varna.bg

<sup>7</sup> Medical University Varna, Medical College, Varna, Bulgaria, k.vl.georgieva@gmail.com



